Railway Mechanical Engineer

Founded in 1832 as the American Rail-Road Journal
With which are also incorporated the National Car Builder, American Engineer and Railroad Journal, and Railway Master Mechanic. Name Registered, U. S. Patent Office

May, 1932

Volume 106 *No. 5*

Published on the first Thursday of every month by the

Simmons-Boardman Publishing Company

34 Crystal Street, East Stroudsburg, Pa. Editorial and Executive Offices,
30 Church Street, New York

Chicago: 105 West Adams St.
Washington: 17th and H Streets, N. W.
Cleveland: Terminal Tower
San Francisco: 215 Market St.

Subscriptions, including 12 regular monthly issues, payable in advance and postage free. United States and possessions: 1 year, $3; 2 years, $5. Canada, including duty: 1 year, $3.50; 2 years, $6. Foreign countries: 1 year, $4; 2 years, $7.

The Railway Mechanical Engineer is a member of the Associated Business Papers (A. B. P.) and the Audit Bureau of Circulations (A. B. C.) and is indexed by the Industrial Arts Index and also by the Engineering Index Service.

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Air-Conditioned Train Inaugurated on the C. & O.

WHEN the Chesapeake & Ohio inaugurated its new train, the "George Washington," on April 24, it added to the luxuriousness and convenience of the type of passenger equipment introduced on its de luxe train, "The Sportsman," over a year ago, the comfort and cleanliness of air-conditioning on all the passenger-carrying cars on the new train. The equipment for the train consists of 22 Pullman sleepers and lounge cars, three C. & O. dining cars and three C. & O. "imperial salon" cars. The air-conditioning system embodies a complete method of pressure ventilation, air cleaning, air cooling in summer, air heating in winter and humidifying or dehumidifying the air as required.

All passenger-carrying cars of the "George Washington" are equipped for air conditioning. Reproductions of historically famous paintings, and rare prints of Washington's time are unique features of the decorations

The Sleeping Cars

Every car in the George Washington bears a name related to some point, person, or place in George Wash-

Dining room of the Gadsby's Tavern, one of the three diners for "George Washington" service

ington's part in the making of the United States. They are named Yorktown, Valley Forge, First Citizen, Potomac, Mount Vernon, Williamsburg, Von Steuben, Fairfax, Rochambeau, Lafayette, Cornwallis, Ferry Farm, Pohick Church, Monmouth, Monticello, Mary Washington, etc. The interior of each car is decorated with a reproduction of some famous painting or the likeness of an historical personage or event suggested by the name of the car itself. For example, the rooms in the car named Valley Forge, instead of being lettered or numbered as has been the custom, are named Anthony Wayne, Nathaniel Greene and Light Horse Harry Lee, three commanders who served under Washington in Revolutionary days. The decorations of these rooms suggest events in the careers of these men. Each berth or section in any of the Pullman cars is so decorated that the surroundings suggest something of the person, place or event for which the car has been named.

The library-observation-lounge cars have been named the Commander-in-Chief and American Revolution. In these two cars the principal decorative features are the painting of Washington Crossing the Delaware and the historically famous scene of the Signing of the Declaration of Independence. The furnishings and decorations are radically different from those which are ordinarily the custom in Pullman cars, suggesting the atmosphere of the period, with such modern luxuries as buffet, valet service, magazines, daily papers, telephone and radio.

The Restaurant Cars

The air-cooling and conditioning system has made possible, in the restaurant cars, the maximum of comfort and convenience. Heat and odors from the kitchen do not reach the dining part of the car. The dining cars,

Underside view showing the electric speed control and V-belt drive from the stand-by motor of the air conditioning system

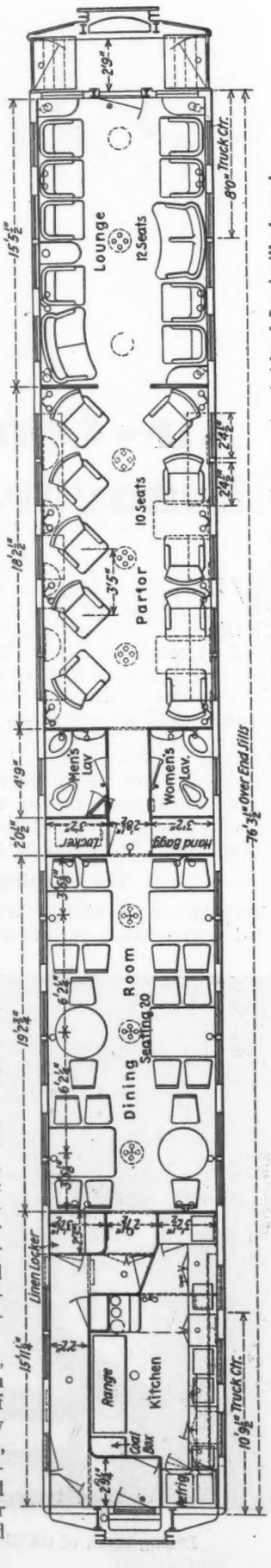
in harmony with the idea of the George Washington, have been named after three celebrated Colonial taverns —Gadsby's Tavern, Raleigh Tavern and Michie's Tavern. Every effort has been made to inject into the decorations as much of the Colonial tavern atmosphere as was practical in the construction of railway equipment. The carpets suggest old colonial rugs on a tavern floor, the chairs are a copy of a famous design by Duncan Phyfe who made some of the furniture for Mount Vernon. Each of the different cars has its walls illuminated by a series of old colonial color prints. Many of these prints are rare editions.

The Imperial Salon cars on the George Washington have been designed to provide the maximum of comfort and convenience for those travelers who do not desire Pullman accommodations. These cars were originated for service on the C. & O. Sportsman which went into service a little over a year ago. To the luxury and comfort of the Imperial Salon cars, as originally designed, has now been added the personal comfort made possible by air conditioning. The salon cars, while of the same size as the conventional car, have been arranged to seat 45 persons. Richly upholstered, individual seats are provided which may be turned round at will. There is a deep pile carpet on the floor and individual reading lights for each chair. Elaborately furnished rest rooms and smoking rooms are part of these cars.

The Air-Conditioning Equipment

All passenger-carrying cars on the new C. & O. train are equipped for air conditioning with the system developed by the Pullman Car & Manufacturing Corporation. The work of installing this equipment was carried on at the Pullman Car Works, Pullman, Ill. The air-conditioning system, which is a product of Pullman engineering throughout, embodies a complete method of pressure ventilation, air cleaning, air cooling in summer, air heating in winter and humidifying or dehumidifying the air as required.

The entire equipment, installed as a unit in each car for the sake of flexibility, is practically automatic in operation, with thermostatic control for both heating and cooling. Uniform air distribution is provided



Arrangement of the Pullman cafe-parlor-lounge car which serves the "George Washington" connection on the Ashland-Louisville branch

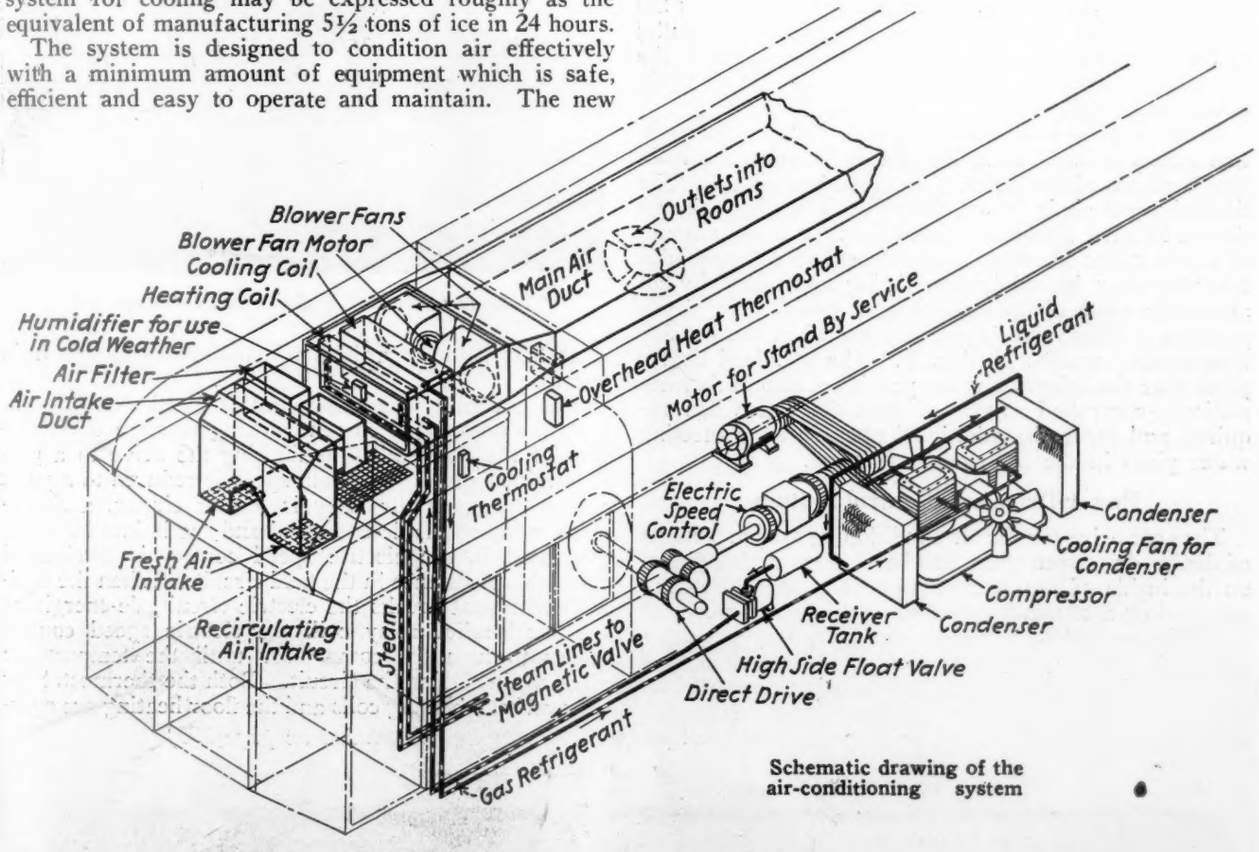
without drafts, owing to the location and type of ducts and outlets employed. The freshness of the air in each car is assured by admitting the proper proportion of fresh air, usually about one part to three parts of recirculated air, dependent upon the number and size of smoking compartments. By maintaining a slightly greater pressure inside than outside of the cars, dust and dirt are excluded. Noise is minimized by eliminating the necessity for open doors, windows or ventilators, thus further contributing to the maximum comfort of passengers who use this equipment.

Tests have indicated that the air-conditioning system as installed in these "George Washington" train cars will afford effective control of air conditions within recognized comfortable temperature and humidity ranges, regardless of outside atmospheric conditions. The heating thermostat is set to control the temperature at a predetermined point, as, for example, 72 deg. F. When outside conditions raise the temperature inside the car to 75 deg. F., the cooling system starts to operate intermittently under thermostatic control, as required. Frequency of operation increases with the rise of outside temperature, maintaining car interior temperatures in the proper relation to outside temperatures, namely, about 20 deg. F. less. Excess moisture is removed from incoming air by condensation on the cooling coils, and dry air, when heating, is humidified by means of a small steam jet automatically controlled. The capacity of this system for cooling may be expressed roughly as the equivalent of manufacturing 5½ tons of ice in 24 hours.

The system is designed to condition air effectively with a minimum amount of equipment which is safe, efficient and easy to operate and maintain. The new refrigerant, Freon or F-12, made by the Kinetic Chemical Company, Inc., a subsidiary of E. I. du Pont de Nemours & Company, is used. This refrigerant, in suitable fin-type coils, cools the circulated air directly, without the use of any intermediate brine cooler and pump, thus increasing the efficiency of cooling about 50 per cent. The condenser is air-cooled, so no water is required in any part of the air-conditioning system. All possibility of trouble from freezing is thereby avoided as well as the complications introduced by the use of pumps, cooling towers and additional blowers, which must be serviced and kept in operation. Freon is not only an efficient low-pressure refrigerating medium, equivalent to ammonia, but has the advantage for use in railway equipment of being non-toxic, non-explosive and non-inflammable, non-freezing at ordinary temperatures and a good carrier of oil for lubricating purposes in the compressor.

Another unique feature of the air-conditioning system in the "George Washington" train cars is the method of power development and transmission. For precooling, when the train is standing at yards or stations, the only type of power required is provided by a standby motor which can be plugged into any convenient source of electric power at 220 volts. When the cars are in motion, power for operating the system is transmitted from one of the truck axles without the employment of electric generator and motors. No additional storage-battery capacity is needed with this system, as the only power requirement not provided for in the main drive is for a small ⅓-hp. electric motor which drives the fans for the main air-circulation system and takes current from the car-lighting battery.

Owing to the compact design of the air-conditioning system, the absence of liquid for condenser cooling and the elimination of indirect electrical power equipment, including batteries, the weight of the equipment has been kept at a minimum.



Schematic drawing of the air-conditioning system

Referring to the diagram, the general arrangement of equipment for air conditioning will be apparent. Power is taken from one pair of inside truck wheels and delivered through a universal drive shaft, electric speed control and a multiple V-belt drive to the compressor-condenser unit carried in a steel box suspended from the

Arrangement of the Pullman cafe-parlor-lounge car

underframe. The 10-hp., 220-volt, 3-phase stand-by motor also is belted to the electric speed control.

The refrigerating medium moves in a closed cycle. The system contains approximately 50 lb. of Freon which is compressed to 150 to 200 lb. per sq. in. in the four-cylinder compressor. It then enters the air-cooled condenser where it is liquefied and subsequently discharged into the receiver tank. The refrigerant then passes through a dryer unit to the high-side float valve (governed by the volume of liquid on the high-pressure side) and is discharged under pressure to the cooling coil in the air-circulating system where it evaporates, taking on heat from the air. It is finally returned through the pipe line to the compressor intake at a pressure of 38 to 42 lb. The amount of cooling is governed by the pressures which vary, of course, with outside temperatures as well as with compressor speed, the latter being governed for 250 r.p.m. for stand-by service and 350 r.p.m. while the train is running.

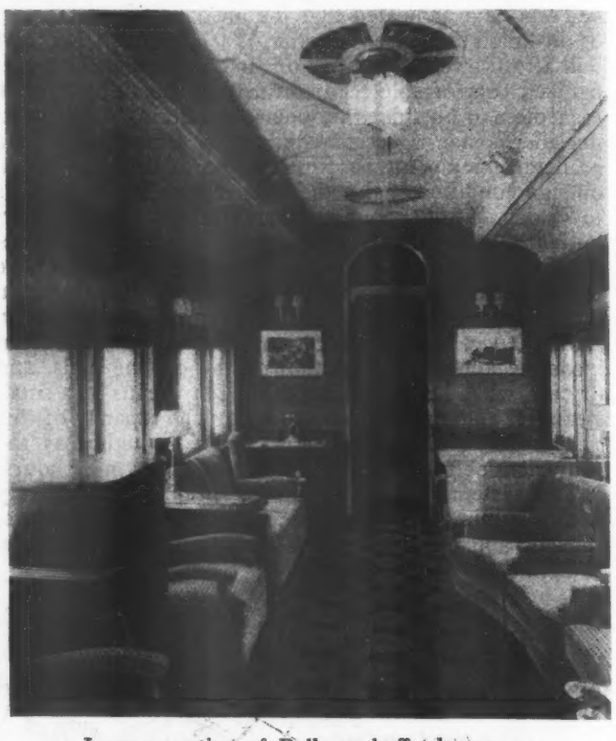
The air circulation may also be considered a closed system, with provision for taking the proper amount of fresh air in through an intake in the vestibule ceiling. This air then passes through a filter and mingles with air from the recirculated air intake in the ceiling just inside the car door. Both recirculated and fresh air are drawn through the heating coil (non-operative during cooling) to the cooling coil, where the air is cooled and excessive moisture removed by condensation. A motor-driven double-blower fan arrangement forces the air through the main air-distributing duct and outlet grills in the ceiling. After cooling the car interior, the air passes to the recirculated air intake and is again cooled and conditioned.

When heating is required in the car, the cooling system ceases to function and steam vapor from the train line is circulated through the overhead heating coil. The filtered warm air is drawn through this heating coil and forced into the air-distribution ducts. A small amount of steam vapor, liberated in the filtered air passage, adds the necessary humidification, being controlled by an automatic valve of the bellows type, operated by vapor pressure. This valve is set to open when the outside temperature reaches 40 deg. F. The standard heater pipes near the floor of the car provide a second thermostatically-controlled source of heat for use when required and serve the additional purpose of protecting water pipes in the car against freezing.

Power Drive and Control System

The gear drive for the air-conditioning system consists of double-drive spur gears and bevel gears with a pinion on the inside of the gear casing. The spur gears are mounted on a standard axle and held securely, yet with a certain amount of flexibility, by mounting on rubber bushings. The bevel gears operate in an oil-tight gear case which contains lubricant. Power is transmitted by a universal drive shaft to the electric speed control which consists of a field and armature, driving pulleys, fly-ball governor and tapped resistances. Mounted on an outer shaft are the field coils and V-pulleys to drive the compressor and take power from the stand-by motor. Mounted on the inner shaft is the solid ring or armature only.

The electric speed control functions on the principle of electric induction and possesses the unique feature of starting the compressor when the train speed reaches five m.p.h., increasing the compressor speed up to a maximum of 350 r.p.m. at about 35 m.p.h., and holding



Lounge section of Pullman buffet-lounge car

it at that point regardless of subsequent higher train speeds.

The governor within the electric speed control regulates the amount of current flowing through the windings of the field coil, thus limiting the drive to a predetermined speed. As train speed is reduced to a point where the generator relay is out of circuit, a shock-relief relay coil is de-energized and the induced current generated in the electric speed control is discharged through a resistance in the field circuit. When the cooling thermostat breaks the electric circuit, de-energizing the shock-relief relay coil, the electric speed control ceases to turn the compressor until the temperature rises, again closing the circuit. Both the thermostat for the overhead heating coils and the floor heating are oper-

(Concluded on page 190)

One of the diners equipped for air conditioning

A Heating Trailer For Electric Locomotives

The New York Central has developed a steam-heating plant, installed in a trailer, for use with electric freight locomotives in hauling heavy passenger trains. An ingenious system of controls permits complete automatic operation

THE New York Central placed in service for the 1931-32 winter season eight heating trailers for furnishing steam heat to trains handled by electric freight locomotives. These trailers were required primarily for certain mail and express trains which are operated down the west side line in New York City to Thirtieth street, but they are also used on passenger trains into Grand Central Terminal when these are handled by the new Class R-2 electric freight locomotives. A few of these locomotives are regularly used in passenger service to handle some of the heavier trains. These heating trailers have worked very well in this service as the boilers are worked at a higher pressure and have a greater evaporation than those now in use on the electric passenger locomotives.

The boiler equipment on the trailers operates entirely automatically once it has been started and the valve to the train line has been opened, which avoids the necessity of anyone remaining continuously in them to handle the firing of the boiler. Once started they are independent of any external power supply and, as the control is operated from 32 volts d.c., they are at all times independent of third-rail power.

Test Performance of the Heating Boiler

	High fire	Inter. fire	Low fire
Boiler pressure, lb. per sq. in.	141	146	152
Evaporation, lb. of water per hr. f. and a. 212 deg. F.	5,956	2,556	1,774
Lb. of oil per hr. (Beaume 37.8 deg. B.t.u. 19,130)	397	162	115
Ratio, lb. of water to lb. of oil	14	16	15
Boiler efficiency, per cent	74	82	80
Temp. rise in preheater, deg. F.	53	38	48
Superheat, deg. F.	0	9	14
Stack temperature, deg. F.	884	494	460
Excess air, per cent	9	19	41
Turbo blower steam pressure, lb. per sq. in.	114	18	18
Turbo blower speed, r.p.m.	3,071	1,140	1,250

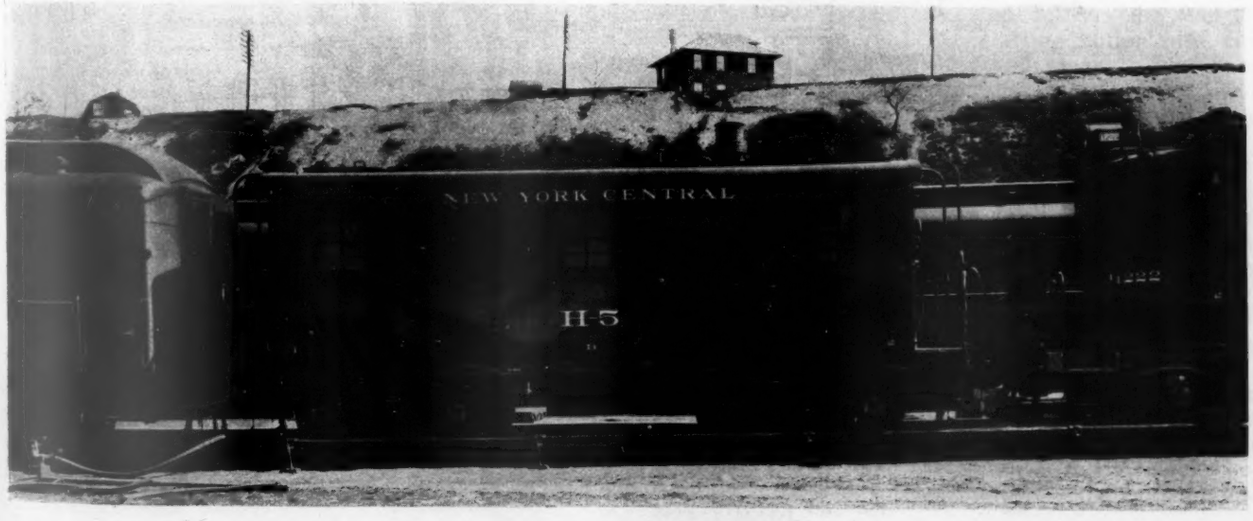
General Design

The trailers are 35 ft. 6½ in. long between knuckles, 10 ft. ½ in. wide over belt rails, and the cab is 12 ft. 7½ in. high. The height over the stack is 14 ft. 9 in. The weight in working order is 102,200 lb., of which 13,500 lb. is fuel and water. The trailers are carried on two four-wheel equalized trucks with 36-in. wheels and 5½-in. by 10-in. journals which are similar in design to tender trucks.

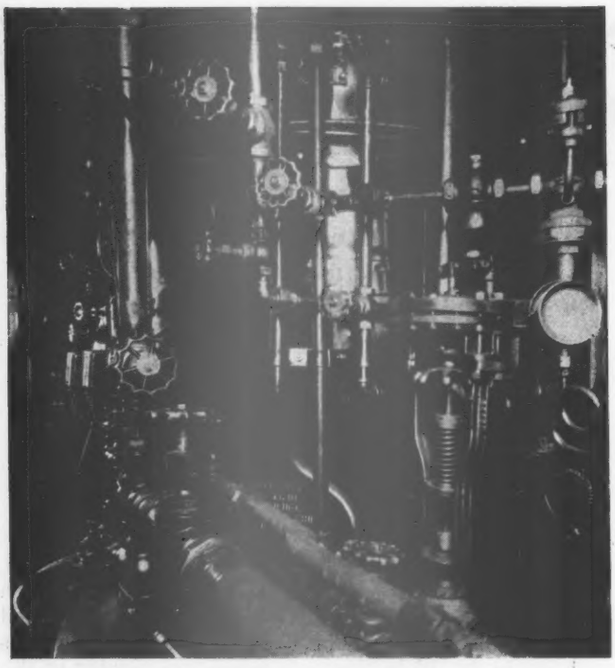
The general design is of the box cab type with platforms at each end, providing ready access. The underframe is a single steel casting with a cab structure riveted and welded to it. Channel posts and carlines form the framework of the cab. Ample hatches are provided in the roof to permit the ready removal of boiler and water tanks.

Each trailer is electrically lighted by 32-volt power which is supplied either by a turbo-generator, or is fed back from the locomotive to which it is connected by means of a seven-conductor train-line jumper. This jumper also carries the control of back-up lamps, which are provided on each end of the trailer, from the locomotive so that the engineman can operate the proper one from his position when making back-up movements. Several circuits used in connection with the operation of the boiler equipment are also carried in this train-line jumper.

The boiler is of the vertical fire-tube type using copper tubes, the upper part of which run dry in the steam



A heating trailer service



Back of the boiler

space. This type of boiler has been used for many years by the New York Central and is the only type thus far developed which gives a high evaporation in a small space with a light weight. The design is shown in one of the drawings and the principal dimensions are as follows:

Working pressure	155	lb.
Nominal diameter	45	in.
Height	3 ft.	11⅞ in.
Length of tubes	36	in.
No. of tubes	1,243	
Outside diameter of tubes (No. 18 Stubs gage)	¾	in.
Heating surface, total	692	sq. ft.
Nominal rated evaporation from and at 212 deg. F.	2,700	lb. per hr.
Maximum evaporation from and at 212 deg. F. from tests	6,000	lb. per hr.

A small superheater, to serve as a steam drier, and preheating coils for the feedwater are installed in the bonnet above the top of the tubes. The firebox was increased 6 in. in depth over the present locomotive boilers, which materially increased the evaporation.

Two combined oil and water tanks of cylindrical design are provided, with oil storage space on top and water at the bottom. They have a combined capacity of 11,000 lb. of water and 1,400 lb. (200 gal.) of oil.

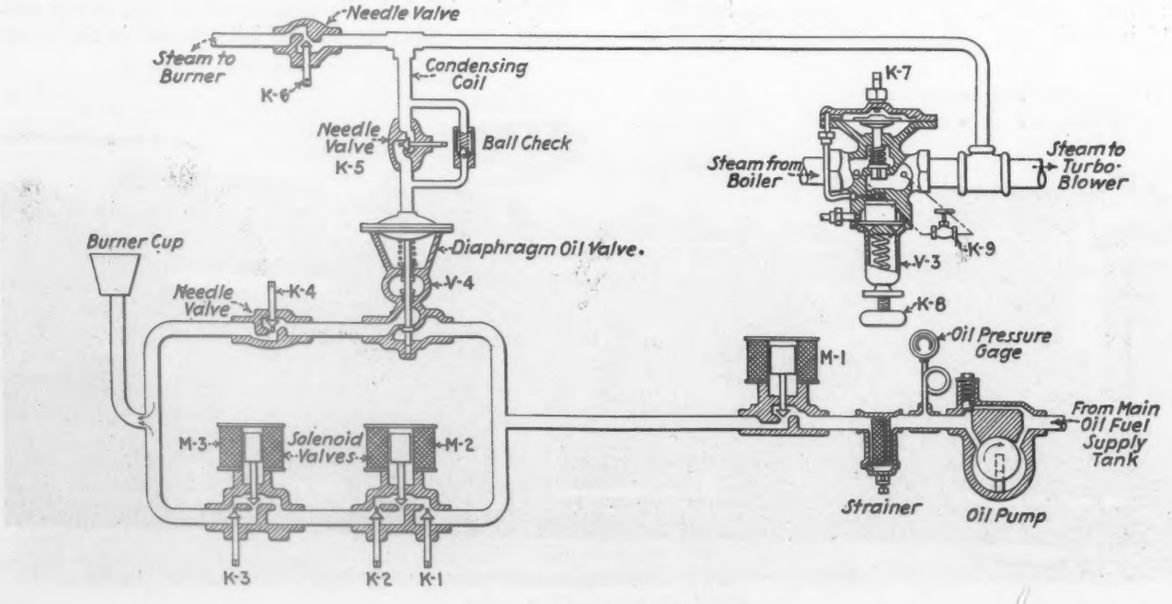
Two air reservoirs, each 16 in. by 60 in., are provided which are fed from the brake pipe through a choke fitting and are used for operating the steam pump on air pressure to put small amounts of water into the boiler when steam pressure is off. They have no connection with the reservoirs used for operation of the air-brake equipment.

The automatic control may be divided into two parts, the water-level control and the fire control. Electric power at 32 volts is required for starting the equipment and this must be supplied from an external source. As soon, however, as the boiler is in operation a steam turbo-generator of 1 kw. capacity is started up, which supplies the electrical load independently of the locomotive. A transfer relay is provided to change over automatically from locomotive power to turbo-generator power. The maximum electrical power required is approximately 800 watts.

Water-Level Control

Water is pumped into the boiler by means of a duplex steam pump. A maximum-pressure governor and a cushion tank on the water end are provided. The governor throttles the steam supply to maintain the pressure at the water end substantially constant at about 180 lb.

The water level in the boiler is held by means of a Swartwout pressure generator controlling a water regulating valve, both of which are shown diagrammatically in one of the drawings. A separate generator used for low-water shut-down is combined with the water-level pressure generator. The water-level pressure generator consists of a chamber having fins on the outside surrounding a pipe which is connected to the boiler in the same manner as a water column. The pressure generator is connected by a small copper tube to the top of a valve diaphragm. The generator, piping and valve chamber are almost filled with water. When the water



The oil-supply control

level in the boiler is high, the pressure generator remains comparatively cool and the pressure in the chamber, piping and on top of the valve diaphragm is at a minimum. The valve *V-2* then remains closed due to the action of the spring.

As the water level in the boiler drops, more of pipe *A* becomes filled with steam and this heats up the water in the generator, increasing the pressure, which in turn causes the valve diaphragm to overcome the spring and open the valve, thus admitting water to the boiler. As the water level rises the pressure is reduced and the valve closes again. The design of the valve is such that it throttles the water supply gradually and thus tends to keep the water feeding at the same rate at which it is being evaporated.

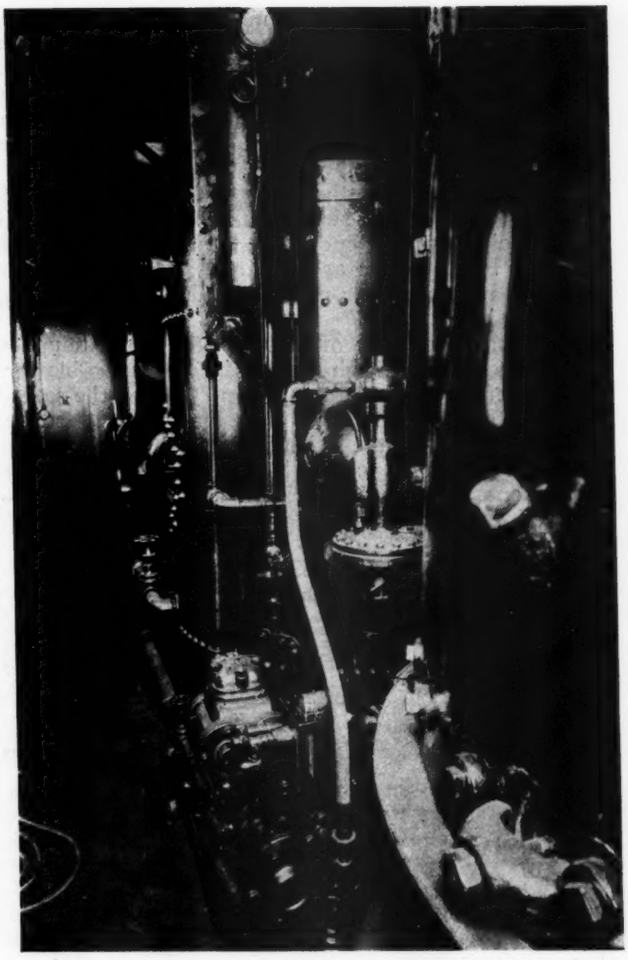
When once adjusted, this water-level regulator is very accurate and will hold the water level to within ½ in., plus or minus.

The low-water pressure generator functions in a similar manner. When a pressure of about 15 lb. is built up in it, the pressure switch *P-3* opens its contacts and shuts down the boiler.

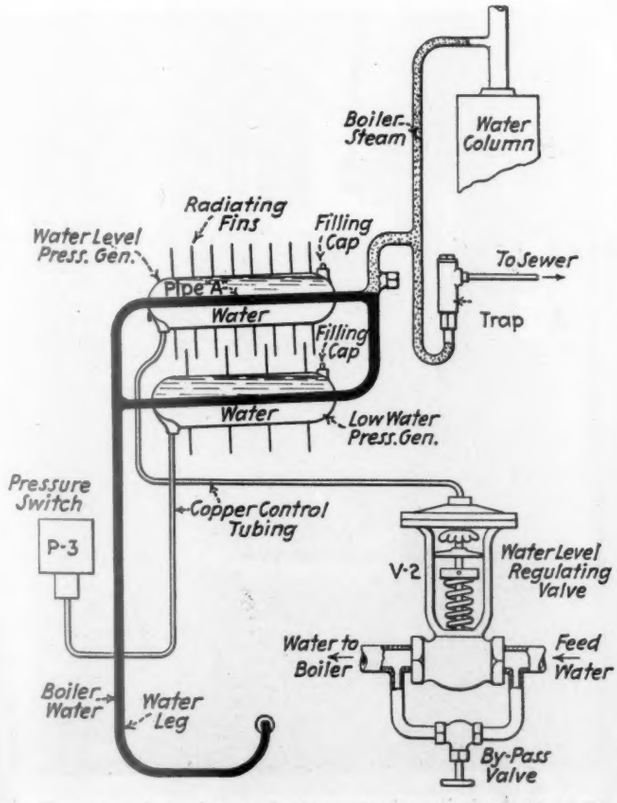
Burner and Fire Control

The burner is of the rotary type driven by a ¼-hp., 3,500 r.p.m. motor. A fan forms part of the burner and this supplies part of the air required for combustion. The larger part, however, is supplied by a turbine driven blower requiring about 8 hp. A small amount of steam is also introduced near the point of oil delivery, which has been found to assist materially in clearing up the fire.

A study of the diagram of the oil-supply control shows that four degrees of fire are provided, one of which is used for starting and the other three for running. These latter are known as high, intermediate and low fires. The intermediate and low fires are controlled by magnet valves having key adjustments, while the high fire is controlled by a steam-operated diaphragm valve responsive to pressure supplied to the turbo blower.



The boiler feed pump with a water and fuel tank in the background



Pressure generators for water-level control

The boiler is started in operation by placing a lighted paper or piece of waste in the firebox and pressing the starting button. This starts the burner motor and the oil-pump motor. The oil pump delivers the fuel at about 25 lb pressure. The starting button also energizes valves *M-1* and *M-3* and allows oil to flow from the pump into the burner cup where it is atomized and then ignited. The amount of fire is regulated by key valve *K-2* and is adjusted to prevent smoking.

As soon as pressure begins to build up in the boiler, steam passes from the boiler through *V-3* to the turbo blower. Under this condition valve *V-3* is wide open. The turbo blower starts to turn over at about 12 lb. pressure on the boiler and begins to furnish air to the firebox.

At 25 lb. boiler pressure valve *M-2* is energized and more oil admitted, the fire now being controlled by valve *K-1*.

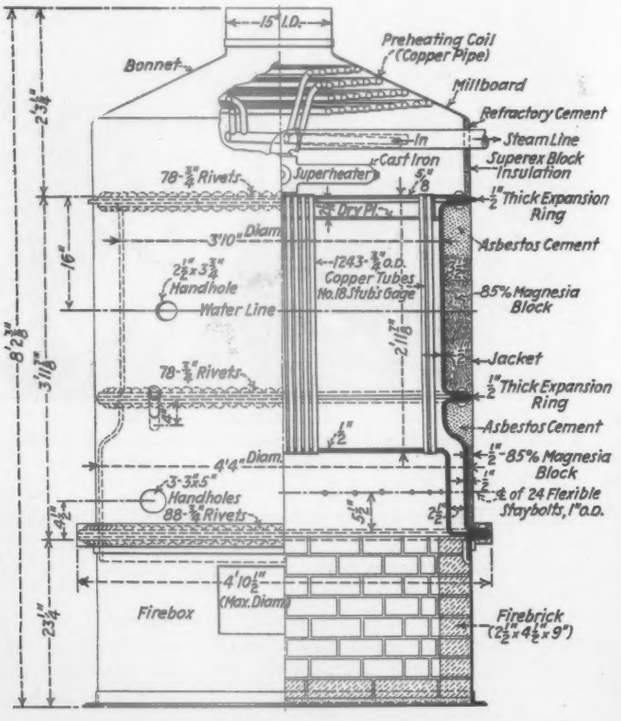
As soon as the boiler steam pressure increases to about 60 lb., which is equivalent to about 40 lb. pressure on the turbine, valve *V-4* begins to open and the oil supply gradually increases to the full volume, regulated by valve *K-4*, with increase of boiler pressure and blower speed.

This condition of fire remains unchanged until the

boiler pressure reaches 145 lb. when a pilot valve in *V-3* causes valve *V-3* to close and drop the turbo-blower down to a low speed, which is regulated by the by-pass valve *K-9*. The reduction in steam pressure on the turbo-blower causes the valve *V-4* to close, reducing the amount of oil flow and setting up the condition known as intermediate fire.

This continues until the boiler pressure reaches 150 lb., when a pressure switch de-energizes valve *M-3* and the oil supply is cut down to the minimum, this condition being known as low fire. At the same time the speed of the burner motor is reduced by inserting resistance in series.

Under this condition of low fire, the boiler supplies just about steam enough to operate the turbo-blower, turbo-generator and steam pump and not pop the safety valves often, without any other load on the boiler. Should the load on the boiler be such, however, as to reduce the pressure to 145 lb., then intermediate fire connections are again established and at 140-lb. pressure high fire is cut in.



The steam generator

The water-level control in the meantime has been functioning to hold the water at the proper level.

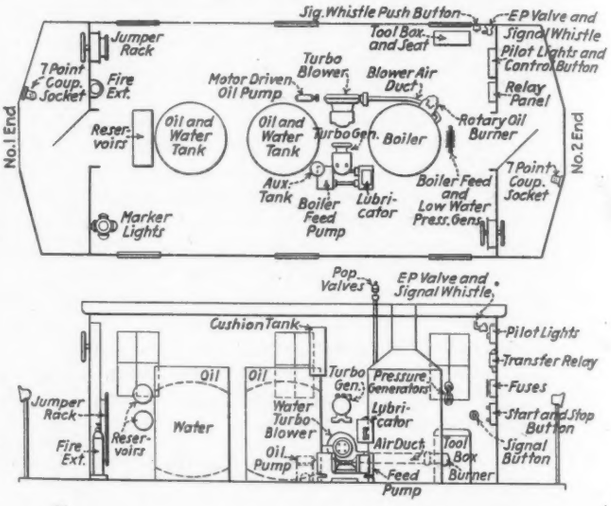
Safety Devices

Safety devices are provided to protect against the conditions outlined below.

Low water.—This has been previously described in connection with the water-level control. This device is arranged to shut down the boiler entirely should the water drop down about 4 in. below normal working level.

Fire going out.—A pyrostat is located in the boiler stack. As long as the fire is burning it remains in the hot position. Should the fire go out for any reason, the pyrostat breaks its contacts and shuts down the boiler entirely.

Pilot lights.—Two are provided, one which lights as soon as the equipment is started and the other as soon as the pyrostat closes its contacts on the hot side. This indicates that the boiler is in condition to function automatically. Pilot lights will also be installed in the locomotives in parallel with the second pilot light so that

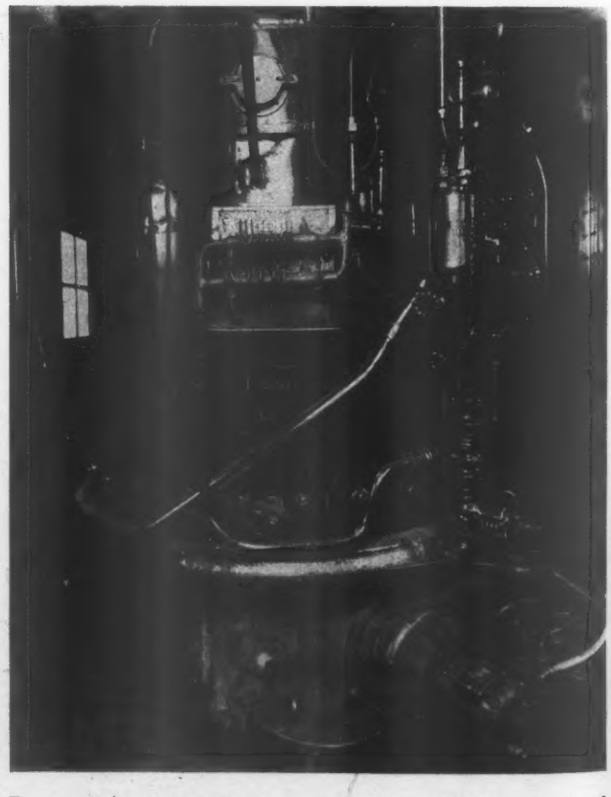


Location of the equipment in the heating trailer

the crew can tell at once if the boiler should shut down automatically.

The data in the table are typical of one of the evaporation tests run on the complete equipment. The steam input to the turbo-blower, turbo-generator and steam pump was not measured, but is estimated to be approximately 1300 lb. per hour when the boiler is operating in high fire and about 650 lb. when operating in low fire.

(Concluded on page 187)



Front of the boiler, showing the burner and the water-level-control generators

Correct Wheel Shop Practices

By Wesley R. Dunbar*

Correct wheel-shop practice requires good supervision—Shopmen should be carefully trained and periodically examined in the use of mounting gages which should be checked against master gages every six months

"ONE of the most important subjects in the mechanical departments of American railways is that of wheel and axle work. Large sums of money are expended in the purchase of wheels and axles and in payment for labor involved. For example, on a railroad system owning approximately 80,000 cars, the total cost of wheels and labor in connection with wheels amounts to over two million dollars a year.

"From the cost view point alone, the importance of wheel and axle work is such that special effort to establish and maintain the best practices is justified. A still more important element is that of safety. Wheel and axle failures not only cause a large loss in property, but may endanger human life as well. That no opportunity may be lost to control these failures in so far as possible, it is imperative that the railroads, private car lines and all outside shops, use every effort to supervise their shop practices in such a way as to produce the best results.

"It is essential that employees, who are responsible for wheel and axle work in the shops and inspection on the line, should have a thorough understanding of their work."

The A.R.A. "Wheel and Axle Manual," from which the preceding quotation was taken, has brought about many improvements in wheel-shop practices and has also distributed knowledge of wheels that heretofore was somewhat lacking to every corner of our railroad family.

Pursuant to correct wheel-shop practice is good supervision. A wheel-shop foreman should be a man with a requisite knowledge of all types of wheels, plus a considerable amount of actual experience on the various wheel-shop machines. Along with this he must have a good understanding of the A.R.A. Rules, especially the rules governing the defects and exchange of car wheels under freight and passenger cars. His assistant should be a good understudy. The assistant should also have a background with some clerical experience to enable him to handle properly the large number of records necessary in wheel shops. A wheel-shop foreman must be a live wire, ready to grasp and handle the ever-changing conditions in connection with the operation of his shop.

To permit correct wheel-shop practices, shop construction and layout is important. Ample loose wheel storage space is necessary to permit proper separation of wheels as to tape size to insure proper mating of wheels with a minimum amount of handling.

Nearly all shops are close enough to car-wheel foundries to avoid carrying an excessive stock of wheels on hand thereby avoiding large wheel-stock balance and

* Abstract of a paper read at the February 26, 1932, meeting of the Eastern Car Foremen's Association. Mr. Dunbar is division car foreman, Delaware & Hudson, Oneonta, N. Y.

Improper mounting practices will soon destroy the effect of all the care taken at the lathes and boring mills

Lathes of this type are used to discover bent axles or wheels not properly bored

the possibility of wheels outliving the guarantee on the platform before being applied for service.

Proper arrangement of storage tracks is necessary to avoid damaged journals and flanges. Loading methods and journal protections are extremely important, yet are often neglected. We have found that a large amount of trouble with wheels after leaving shops can be attributed to careless methods of loading and slack methods for the protection of journals.

Boring Mill Practice

Boring mill practices are often neglected. Proper boring of wheels is the most important machine operation in any wheel shop. A wheel improperly bored does not ordinarily cause trouble until it has been in service for some length of time and then—usually a bad accident. The base of a wheel must be perpendicular with the plane of the wheel to avoid untrue running of the wheel resulting in uneven flange wear. The bore must be concentric with the tread to avoid out-of-roundness, resulting in truck and track damage.

Extreme care must be exercised in wheel-bore diameters, and smoothness of the bore, to prevent loose wheels or tearing of axle-wheel seats.

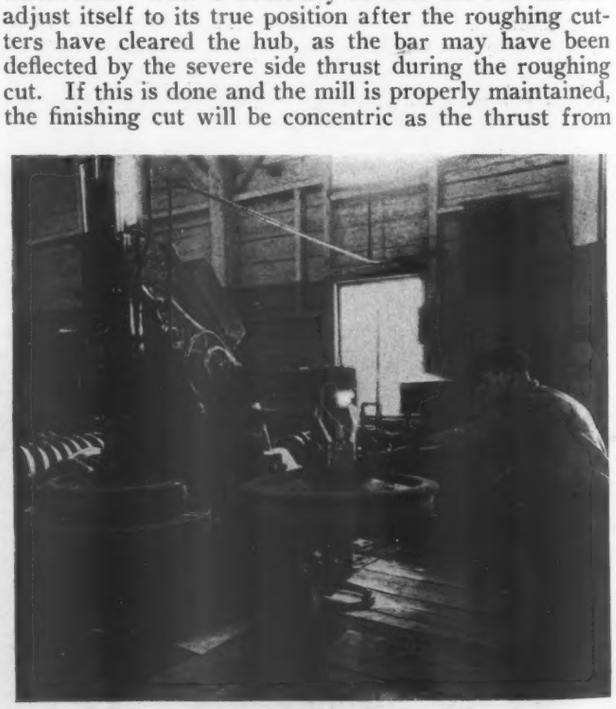
Wheel boring mills should be of rugged construction with particular attention being paid to maintenance of the boring bar, cutters and chucks. The mill must be maintained with the table running true and with the boring bar held true with respect to the center and plane of the table, and without chatter.

Chuck jaws for holding wheels during the boring process should be closely checked each week to insure proper holding of wheels concentric with the axis of the boring bar. A five-jaw chuck is desired. In case one point or jaw fails to make contact with the wheel there is an indication of wheels being untrue or out-of-round. These jaws should be checked periodically to prevent excessive wear.

New wheels can be properly alined by use of the correct chuck. In the case of old wheels however, the alinement should be made with the front face of the rim. The necessary hard steel block of equal height should be used on the cleaned surface of the table to support the front face of the rim of the wheel.

It is always important to have the wheel clean and free from dirt, ice or snow, to insure correct concentric chucking and boring. Proper storage of loose wheels will insure this during inclement or freezing weather.

The boring bar itself should have a positive micrometer adjustment for the cutters, accurate to 0.001 in. If separate roughing and finishing cutters are carried in the boring bar at the same time, they should be separated by a distance greater than the length of the wheel hub. This is necessary so that the bar can readjust itself to its true position after the roughing cutters have cleared the hub, as the bar may have been deflected by the severe side thrust during the roughing cut. If this is done and the mill is properly maintained, the finishing cut will be concentric as the thrust from



Boring wheels is the most important machine operation in any wheel shop

a shallow cut is not sufficient to deflect the boring bar.

If much metal has to be removed from the bore, at least two separate cuts are necessary to secure a proper finish. The finished bore should be straight and truly round throughout the length of the hub, concentric with the tread of the wheel and with a smooth surface free from ridges, scores or chatter marks. Scoring may permit the seepage of oil and cause the wheels to be removed on suspicion of being loose.

A radius or chamfer of approximately ⅛ in. must be turned at the entry or back end of the hub bore to prevent scoring the wheel seat during mounting. This cut may be made before or after the finishing cut but must never be taken while the finishing tool is in the bore as it will exert enough side thrust to cause the finishing cutter to score the bore.

Care should be exercised in withdrawing the boring bar after the finishing cut to avoid scoring the bore.

Three conditions must be met to give a tight and effective grip on the axle over the entire bearing area of the wheel seat and thus avoid a wheel working loose on the axle, or a burst hub:

1—The wheel bore must be truly round, smooth and free from taper.

2—The axle wheel-seat must be truly round, smooth and free from taper.

3—The difference in diameters, or allowance, between the bore and wheel-seat should be only sufficient to give a mounting pressure within the range prescribed for that type of wheel.

In addition, the axle wheel-seat must be concentric with the journal surface and the wheel bore must be concentric with the tread in order to have wheels run true in service.

Mounting Wheels on Their Axles

The first condition has been discussed above and the second will be taken up under "Axle-Lathe Practice." As to the third, the allowance depends upon the diameter of the wheel-seat and bore. Ordinarily, the bore should be tighter than the wheel-seat diameter by 0.001 in. for wrought-steels and 0.002 in. for cast-iron wheels for each inch of diameter. The metal may, however, vary in hardness so that this rule should be supplemented by the operator's experience. The governing factors as to proper fit are the tonnage limits and the character of the mounting pressure diagram, which are discussed under "Wheel-Press Practice."

Inside and outside micrometer calipers are recommended for the measurement of wheel bores and axle-wheel seats to insure consistent results. It is almost impossible to detect taper and out-of-round conditions of a wheel bore without their use. An axle may be checked in a lathe. But in all cases the wheel should be fitted to its axle. All wheels should have the bore cleaned out and inspected for roughness and chips, and re-calipered.

It is preferable to mount new wheels on second-hand axles with wheel seats reduced in diameter, and to mount second-hand wheels on new axles or axles with nearly the maximum seat diameter.

This is done to make the best use of metal both in the axles and wheels. It is particularly necessary in the case of multiple-wear wheels where many successive borings are necessary.

When mounting new wheels on new axles, wheel seats should be finished to the standard new dimension and the wheel bored sufficiently smaller to make the fit.

New wheels should never be bored for application to over-size wheel seats. Second-hand wheels having bores too large for standard new wheel-seat diameters may be applied to axles with wheel seats not exceeding ⅛ in. over the standard diameter. All wheels selected for mating should be of the same tape size.

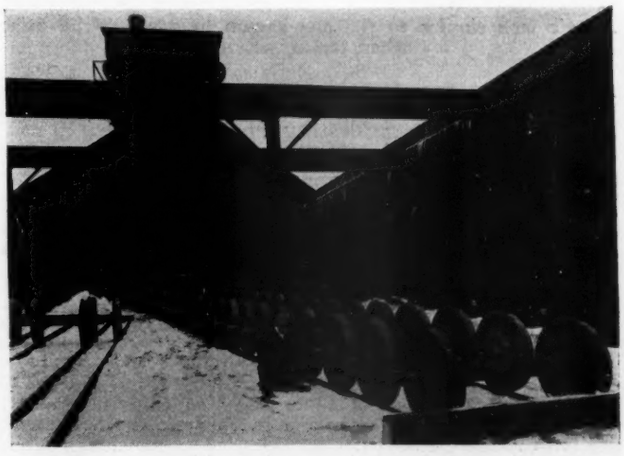
Axle-Lathe Practice

Correct axle-lathe practice is important. Second-hand axles require close inspection before being returned to service. Axles should be carefully measured for tapered, oversize or undersize wheel seats, journal diameters and lengths, also collar thickness. Careful inspection is necessary to avoid returning to service journals with seams or cracks either lengthwise or around the journals. Badly scored fillets should be restored in the lathe to the correct radius. Axles having torn or rough wheel seats should be placed in lathes and trued. This will insure proper mounting of wheels to the required pressures and avoid oil seepage and subsequent removal of wheels on suspicion of being loose, also danger of misfits in mounting or bursting of the wheel hub. Axle centers should always be cleaned out before placing axles in lathes for truing to insure concentric turning of journals and wheel seats.

Axles found to be scrap after careful inspection should be placed immediately in scrap storage to avoid any possibility of return to service. Such axles should be marked "scrap." In our shop yellow crayon has proved satisfactory.

In any wheel shop today, regardless of size, at least one axle lathe can be well employed in re-turning axle wheel seats and journals to proper condition. The more axles that can be passed over a lathe, if for checking for trueness only, the more wheel failures and accidents will be avoided.

On some roads in the past it has been common practice to weld axle fillets. The heating of this section causes cracks and subsequent breakage of the journal. This is a condition which must be closely followed and all axles showing evidence of welded fillets should be placed in lathes and a cut taken on the fillet. If short chips result when cutting, the axle should be scrapped as this is an indication of a welded fillet. Many are discovered on axles during reconditioning in a lathe that were not apparent during the usual inspection.



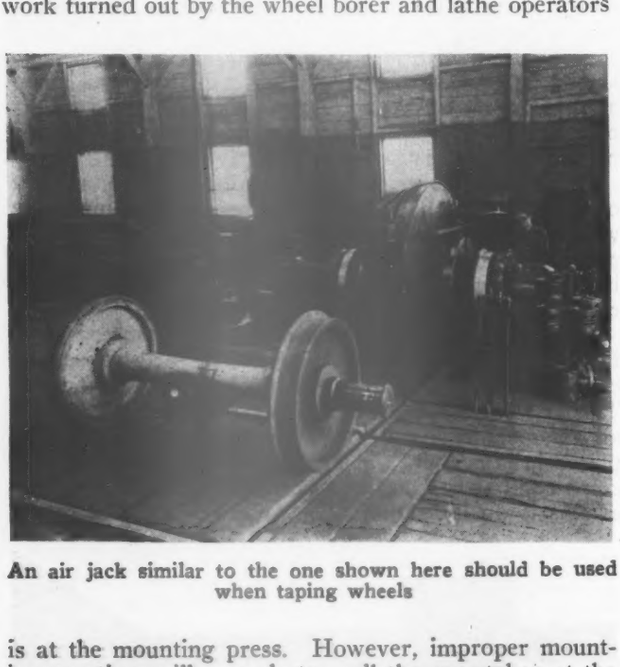
Journals should be protected to prevent rust while wheels are in storage

When truing journals, cutting tools are very important. Narrow tools should not be used. A wide tool, about 1¼ in. in width, is preferable for finishing cuts with the necessary radius of ¾ in. on one side for the fillet and ⅛-in. radius for the collar, and should be absolutely straight. Standard gages for grinding should be maintained to insure uniformity. The cutting edge

of the finishing tool should set slightly above the center line of the journal to produce the best results. Axle lathes should be of sturdy construction and tools set to prevent chatter. Burnishing or polishing may be employed in finishing journals. If burnishing is employed, burnishing tools should be of the double roller type, one in front and one in back of the journal on each end of the lathe. Suitable oil should be used during the rolling process. Particular care should be used to see that all dirt or chips are flushed off the journal before rolling.

Immediate protection should be given journals after finishing to prevent rust. Axles after finishing should be handled very carefully to prevent bruising. Metal covers or protection should be used. An axle removed on account of overheating requires close attention, especially for cracks. Discoloration should be entirely removed.

One of the best points to check up on the quality of work turned out by the wheel borer and lathe operators



An air jack similar to the one shown here should be used when taping wheels

is at the mounting press. However, improper mounting practices will soon destroy all the care taken at the lathes or boring mills. The following should always be first in the minds of the mounting-press operators:

1—See that wheel bores and wheel seats are free from chips and dirt and are painted with a mixture of white lead and boiled linseed oil, and properly started on the axle to prevent cramping or cocking of wheel which will result in torn wheel seats, or bores and misfits.

2—Use correct check gages. These should be periodically checked with master gages to avoid the use of worn gages. Master gages should be available at all times and stored in a sturdy case to prevent damage.

3—Wheels must be mounted centrally on axles to protect against excessive flange wear and hot boxes. The best practice is to measure and center all axles before mounting. The center mark can be punched or marked with crayon. A gage, as shown on page 117 of the "Wheel and Axle Manual," with the pointer touching the center mark on the axle may be used. Another method is the use of the hook gages for each axle size that fits over the end of the axle and of the proper length to touch the wheel hub just scant of the final position of the wheel. Each wheel should then be pressed on just one-half the distance to take the mounting gage.

4—Operators should be carefully trained and periodically examined concerning the use of mounting gages. Journal guards or sleeves should be used during the entire mounting operation.

5—Correct mounting pressures should always be maintained to prevent loose- or tight-fit wheels. Hydraulograph pressure-recording gages should be used on all mounting operations. The recording gages have proved valuable. Through the medium of the recorders every wheel mounted is recorded on a chart as to number and mounting pressure. The quality of work performed is clearly recorded during the mounting process. Any sluggishness in reaching the proper pressure is recorded as well as any irregular pressures or sudden rising of pressures. All these conditions indicate poor boring or improper wheel seats. These recording gages as well as regular dial gages on the press should be checked with master pressure gages which have passed the necessary accuracy tests. This is to avoid any possible improper recording of mounting pressures.

Mounting-press men should be particular to mate wheels to the axles as previously designated by the boring-mill operator, and also be sure that the number marked on the wheel corresponds to the number on the wheel seat. These numbers are placed by the boring-machine operator while measuring wheels for boring. Any failure of press men to properly mate wheels and axles will result in misfits and confusion.

Immediately after wheels leave the press, the journals and hubs should be given careful inspection. If the journals show no sign of bruises or damage a good rust preventative should be applied immediately. This should be of sufficient durability to prevent washing off or melting under the heat of the sun. No material that will cake or dry hard on the journal should be used.

Turning Axle Journals with Mounted Wheels

Most wheel shops are equipped with a machine wherein the journals of mounted wheels can be turned without dismounting the wheels. Mounted wheels can be rolled or lifted into this machine by means of hoists. In addition to the truing of journals, this machine is an excellent one on which to test wheels for bent axles, wheels bored out of center or out of round. It is considered excellent practice to pass all engine and passenger-car wheels through a lathe of this type for this test.

Wheels and journals should receive a final inspection just prior to being delivered to the storage or loading tracks. Handling of mounted wheels with wheel sticks should be avoided. Proper arrangement of storage and loading tracks is necessary and the service of an overhead traveling crane over storage and loading tracks for the purpose of classifying wheels according to size on the storage tracks, as well as loading into cars for shipment, is a practice that is economical beyond doubt.

Dismounting Wheels

All shops of any size should have separate presses for dismounting and mounting wheels. The dismounting press should be so located as to line up with the rails of the unloading tracks. The unloading tracks should lead direct to the dismounting presses. Wheels placed on this track should be carefully inspected for defects for which they were removed and any other defects which may have been passed up at the point of removal. This also applies to journals which should be measured and marked for any defects found. All wheels forwarded to the shop for handling should be properly marked as to defect. Any exceptions taken to these markings or failures to mark should be reported at the wheel shop and forwarded on a special form to the A.R.A. billing department for correction before rendering the bill. Remount gages should be carefully used on all wheels considered for remounting.

Just prior to entering the press, a device, such as an air cylinder jack or raised platform, should be placed in the center of the track leading to the dismounting press to facilitate the raising of wheels off the rails to permit accurate taping of wheels that are to be remounted. Wheels should then be marked according to tape size.

Journal protection should also be used during dis-

mounting to prevent any unnecessary damage to journals. The shop layout should permit delivery of scrap dismounted wheels directly to the scrap car without intermediate handling. Overhead hoists and runways should be provided to enable the operator to deliver axles that need reconditioning before remounting directly to storage as near to the axle lathes as possible. An additional hoist and runway should be provided to permit direct delivery of scrap axles from the dismounting press to scrap storage.

Gages Should Be Checked Every Six Months

Numerous gages are used, including the A. R. A. condemning gage, remount gages, journal-length gages, and mounting gages. These gages will accumulate considerable wear during service and unless periodically checked, you will waste many dollars as well as create hazards of wheels failing in service.

This practice not only applies within the wheel shop, but to all wheel gages in service on the system. We have established a practice on our road to have all wheel and coupler gages, remount gages, and journal gages, checked twice a year with an accurate master gage used only for checking purpose. It is surprising the results you will get when making these checks. In spite of one's efforts to prevent it, men will use gages as tack pullers or hammers. A periodical check of gages encourages their proper care by the men using them.

We have found that education of our men has resulted in more efficient performance of their duties. I mention this to emphasize the fact that not enough time can be spent in teaching and examining men as to the proper use of gages.

One of the most important wheel defects, which has been one receiving careful consideration for the last year or so by the A. R. A. Wheel Committee, is the worn-through-chill condition which is found to be quite prevalent, especially on the older chilled-iron wheels. This has been in the past a judgment defect. It is one of the most dangerous wheel defects and inasmuch as the best judgment sometimes fails, the committee is working on a gage that will assist in condemning such dangerous wheels. Worn-through-chill wheels may result from insufficient chill in the wheel when manufactured. Flat spots allowed to run and work cut will result in worn-through-chill wheels.

We have a gage on the Delaware & Hudson which is used to find and judge worn-through-chill. If a spot 8 in. or over in length, 1/8 in. deep exists, the wheel is condemned. Of course, if spots less than 8 in. in length that show more than 1/8 in. in depth are discovered, the wheel can usually be condemned. We have checked by sending wheels condemned by this gage to wheel works for breaking and find that without exception the wheel is actually worn-through-chill. This gage also assists materially in locating out-of-round wheels that may have been imperfectly cast.

Another situation with which we are all confronted in our wheel shops is the wheel with shelled-out spots, thermal checks, and brake burns, that are removed on account of their mate wheels being condemned by A. R. A. gages but in themselves are not in bad enough condition to condemn technically by A. R. A. gages, while our good judgment tells us they should not be returned to service. They amount to merely scrap wheels, still we must allow owners secondhand value because technically they cannot be scrapped and billed according to A. R. A. rules.

In the case of flange wear, the remount gages fill in this gap between A.R.A. condemning gages and good judgment.

We no doubt remove hundreds of wheels a year as described above and satisfy ourselves with the scrap we can realize even though the owner is allowed secondhand value. This difference is the premium we must pay for safety. Like Rule 108 items, it may equalize as a whole between roads. Perhaps some time the Wheel Committee will take action with this case as was done in the case of flange wear as covered by the remount gage and give us some limits on such defects when remounting is involved.

Multiple-wear wrought-steel-wheel practices are likewise important. Service metal on multiple wear wheels is valuable to the extent of $1.01 per 1/16 in. Considering the fact that there are about 40/16 in. of this metal on each wheel, or about $40.00 worth, it is exceedingly important, and the waste resulting from careless turning or unnecessary removal of metal involves real money. One of the most essential assets to any wheel shop handling steel wheels is worthy, well instructed and conscientious operators. Proper selection and training will usually take care of this requirement.

Steel Wheels

Steel wheels coming to the shop for restoring to full flange contour or reworking on account of other defects require the same careful inspection and gaging as chilled-iron wheels. Proper use of the standard wrought-steel-wheel gage is necessary to determine the minimum amount of metal to be removed to recondition a wheel. Failure to do this will result in unsatisfactory performance of the work.

Proper cutting tools are necessary in finishing the tread and flanges of steel wheels to prevent ridges, chatter marks, grooves and tears. A smooth finish will insure longer life of the wheel and render the wheel less susceptible to sliding. An operator, no matter how good, cannot turn out good work without the proper machinery.

Before placing wheels in lathes, each wheel should be taped and gaged. Gages should be used on at least three points around the circumference about one-third of the circle apart. The tape size, rim thickness and amount of metal to be removed should be chalked on the back of the wheel on the plate.

The A. R. A. standard steel-wheel gage is so calibrated that when applied with the leg flat against the back of the rim and the end of the movable finger is pressed against the face of the flange, the scale on the finger will read directly in sixteenths of an inch the amount of metal to be removed at the center of the tread to restore the flange contour with a "witness groove." The zero mark on the finger corresponds to a normal flange thickness of 1-5/32 in.; the specification tolerance permits this dimension to vary 1/16 in. over or under which would include readings on the gage from somewhat beyond zero (a minus reading) to the mark 2 on the finger. For any gage readings within this range, therefore, the flange should be considered as equivalent to new. Due to the reduction in the size of the cut, the calibrations on the finger from zero to 4 are not shown, but actually appear on the gage itself in accordance with the table.

The witness mark on the flange serves two purposes. First, its presence in the finish turned wheel shows that the lathe operator has not wasted service metal by turning more off the tread than necessary. Second, it permits the saving of about 1/8 in. of service metal each time a wheel is turned. This witness mark however, must not be more than 3/64 in. deep, and must not extend into the throat of the flange. Due to the important part the throat plays in wheel service and safety it

is essential that these limits for the witness mark be observed.

If a wheel has a slid-flat spot, the gage should be applied outside of the flat spot to determine the total amount of tread metal to be removed to restore the full flange contour. Another reading must be taken in the flat spot, noting the difference in reading on the back leg from the previous similar reading. This difference plus $\frac{1}{16}$ in. allowed for cutting under the hard spot is the amount necessary to remove the slid flat.

For measuring tread wear or flange height, the gage used as shown in Fig. 128 of the Wheel Manual, corresponds approximately with $\frac{3}{16}$ in. hollow wear in the tread. The calibrations from zero to 7 on the leg of the gage in the upper right corner of Fig. 122 are applied optionally for measuring flange heights less than 1½ in. The use of this added calibration is illustrated in Fig. 129 of the Wheel Manual.

Many pairs of wheels which come to the wheel lathe for turning require considerably more tread metal be removed from one wheel than from the mate to restore the tread and flange contour. This is usually due to flange wear or occasionally to shelling on one wheel. It is apparent that if the good wheel is turned down to the finished diameter of the defective wheel, the cost in dollars and miles will be considerable.

It is economical practice, therefore, to dismount such wheels and remate them with other wheels which have about the same bore diameter and which would finish to the same tape size without such a loss of tread metal, so that a difference of perhaps $\frac{3}{8}$ in. in service metal to be removed may be necessary to justify such practice.

Correct Practice Is Not Confined to the Wheel Shop

Correct wheel-shop practices are not confined within the wheel shop itself, but extend over the line to all repair shops, light-repair tracks or yards. One of the most important practices today in view of the general railroad economic situation is the close co-operation between the foreman using mounted car wheels and the source of supply which is to most of us the stores department. It is just as important to keep the surplus mounted car-wheel supply to a minimum at outlying points as it is to keep the supply of loose wheels on hand at wheel shops to a minimum. It has been discovered that some foremen have a tendency to hoard re-conditioned or new mounted wheels. His reason is usually, using his words—"for protection." His idea is fine, but if he is questioned, you will usually find that he has not developed any comprehensive data whereby he has determined the minimum number of wheels that his protection requires, with the result that it is found that stocks of wheels can be materially reduced and large savings made.

Shortage of wheels is likewise expensive. The return of wheels to the shop for reconditioning is of importance. It has been found that it was the habit of some foreman to fix his mind on his supply of good wheels and have a tendency to neglect loading up his accumulation of scrap for return to shop. This condition naturally encourages the over purchase of new wheels and axles to keep up with the pool or demand, and often a surplus of secondhand axles and wheels which are usually difficult to work off in wheel shops, especially when large numbers are allowed to accumulate.

This can be easily controlled by means of a daily wheel report on which is indicated in sizes and kinds all wheels on hand, and wheels disbursed or used during the day. On this form is a space showing requirements as well as scrap wheels on hand for shipment. In addition to this, the receipt of the last shipment indicated

Wheel gages should be checked against master gages every six months

provided that the cost of dismounting and remating does not exceed the saving in value of the service metal.

The point at which such practice pays depends on the cost of operations and the machine equipment of each individual shop and should be worked out on that basis by the foreman or superintendent. If the shop is completely equipped for dismounting and remounting, a difference of $\frac{1}{16}$ in. in service metal to be removed between mate wheels will ordinarily justify remating to save service metal. If the wheels have to be shipped to another point for dismounting and remounting, the handling costs will also have to be considered

by car number is shown. This form is forwarded daily to the wheel-shop foreman through the offices of the division car foreman and general foreman. In this manner the wheel-shop foreman knows the wheel situation exactly and can be governed accordingly. This also enables the division officer to keep a check on wheel consumption and stock balances which result in small inventories. Car movement makes an excellent measuring stick for the control of demand and supply of wheels.

The reporting of defective wheels or improper workmanship on wheels, improper loading or improper handling of wheels in transit should be required. This report should be forwarded directly to the division officer who should handle for correction in a constructive way with the proper parties.

Wheel cars assigned to wheel service usually carry from 18 to 24 pairs of wheels. Much blocking is involved resulting in high maintenance of wheel car floors and transportation charges resulting in such numerous and small shipments. Some roads, including the Delaware & Hudson, have designed cars equipped with cradles or rests cut out to take the contour of the wheels. This eliminates blocking. With this method two or three tiers of wheels may be loaded on one car thereby making one car do the work of two or three. This eliminates transportation and handling costs as well as maintenance costs with respect to the cars and blocking.

Heater Trailer For Electric Locomotives

(Continued from page 180)

Aside from the desirability of having the operation of the boiler automatic in order to eliminate the necessity for constant manual attention, a number of other advantages are obtained over manual operation.

The principal one is the better combustion due to the adjustment of the oil supply being fixed and not subject to possible error in judgment of the fireman. This results in better fuel consumption, better evaporation and lower maintenance due to cleaner tubes and fewer leaky ones as firebox heat is more evenly distributed. Smoking is also eliminated.

The automatic water-level control also assists in reducing the boiler maintenance by keeping the tubes at a more uniform temperature. It also allows the evaporation to be materially increased. With the high evaporation rates used on these boilers the water level must be just right to secure the maximum evaporation and a change of ½ in. above or below this level materially reduces the evaporation.

With the automatic equipment there is a great deal less blowing of pop valves, which is annoying to passengers on station platforms. This is also true when running and it has also been noted that there is considerably less operation of the turbo-blower at full speed than with manual operation, which increases the efficiency as well as reduces the maintenance.

In general, it may be stated that enough advantages are obtained with the automatic equipment to warrant its adoption, even though there may not be any particular need of eliminating the manual supervision.

The steam heat trailers were designed by the New York Central engineers and built by company forces at the Harmon Electric Shops. The boilers were furnished by the Peter Smith Heater Company which also furnished most of the automatic boiler equipment in accordance with designs worked out jointly with that company by the New York Central engineering forces.

Substantially the same equipment has been applied to the 22 locomotives operated in the Cleveland Union Terminal. The principal reasons for the adoption of the automatic equipment were to reduce the amount of smoke and gas in the terminal which is mostly covered and to decrease the maintenance, both of which results have been accomplished. The equipment was tested out there first, one locomotive having been equipped in the spring of 1931. Also the requirement of operating the boilers in the Cleveland Union Terminal was the underlying reason for developing the automatic control equipment.

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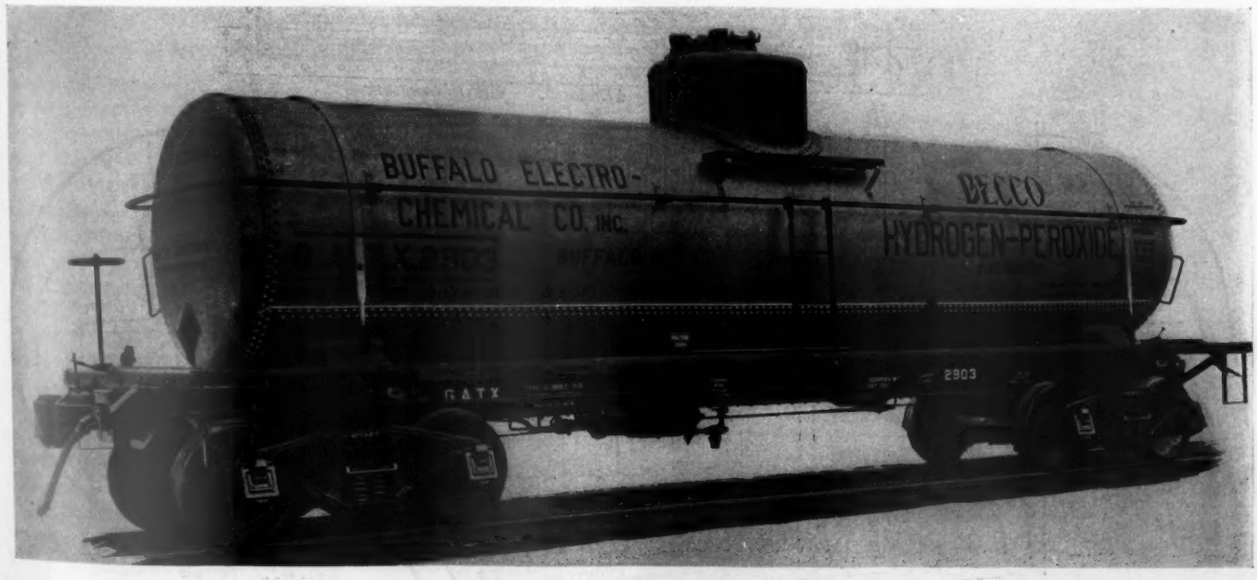


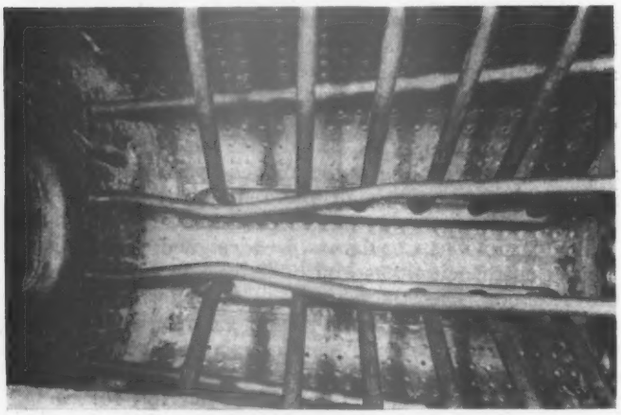
Tank car for transporting hydrogen-peroxide built by the General American Tank Car Corporation

This car has a capacity of 8,000 gal. and is used for shipping hydrogen-peroxide to textile mills where the chemical is used for bleaching purposes. The tank is made of aluminum plates manufactured by the Aluminum Company of America.

Semi-Water-Tube Firebox Developed by the B. & O.

THE Baltimore & Ohio has developed and applied to a number of its heavy 2-8-2, 4-6-2 and 4-8-2 type locomotives a semi-water-tube firebox which can be installed inside the conventional firebox of stayed construction, with or without a combustion chamber. This development was in connection with a program of

Over thirty per cent increase in heating surface secured by adding two rows of water tubes to stayed fireboxes of conventional construction—Designed to increase circulation in the side water legs



View inside the semi-water-tube firebox looking up toward the crown sheet

modernization which the B. & O. has had in effect for the past five years.

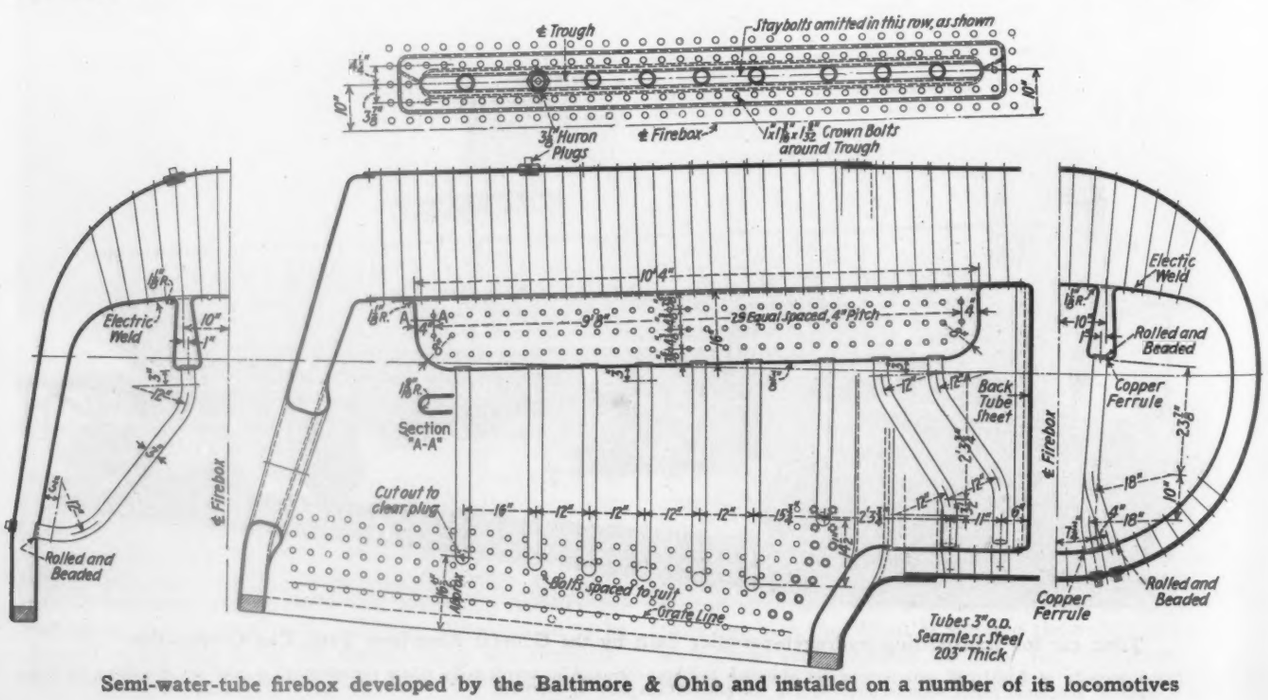
To modernize a locomotive built 10 or 12 years ago and increase the tractive force at high speeds it is necessary materially to increase the boiler horsepower. This is one reason why the B. & O. developed the Emerson water-tube firebox which eliminates crown-sheet, radial and side water-leg staybolts, the only staybolts being in the throat sheet and backhead. This water-tube firebox has been applied to a number of locomotives on which complete new back ends have been required as well as to two of the B. & O. test locomotives recently built by the Baldwin Locomotive Works.*

The semi-water-tube firebox was developed to obtain a material addition to the heating surface from existing fireboxes. This firebox, shown in the drawing, consists of two troughs about 16 in. deep which extend longitudinally in the firebox and are welded to the crown sheet. The bottom of each trough is connected to the side water legs of the firebox by a number of circulating tubes. These tubes are rolled and beaded in both the side sheets and the troughs.

Increase in Heating Surface

This semi-water-tube firebox effects a marked increase in direct firebox heating surface. The heating surface on the 2-8-2 type locomotive on which the first

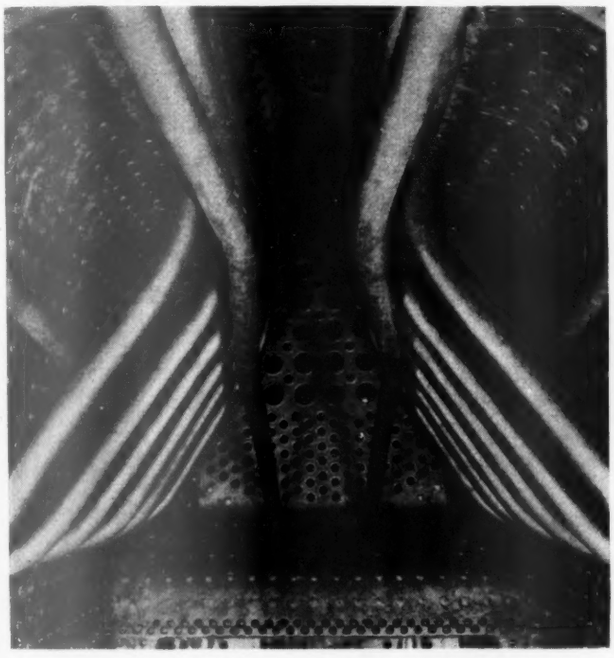
* A description of the Emerson water-tube firebox, which is referred to here, appeared in the August, 1931, issue of the *Railway Mechanical Engineer*, page 397.



Semi-water-tube firebox developed by the Baltimore & Ohio and installed on a number of its locomotives

installation was made was originally 256 sq. ft. With the semi-water-tube firebox, an additional 74 sq. ft. of heating surface was acquired, making a total of 330 sq. ft. The former firebox, by Cole's ratios, evaporated 14,056 lb. of water per hour, while the semi-water-tube firebox is capable of evaporating 18,173 lb. of water per hour, or an increase of 29 per cent.

Before conversion the firebox shown in the drawing had a heating surface of 327 sq. ft., including the combustion chamber. After the semi-water-tube firebox



Firebox with semi-water-tube installation showing the back flue sheet and combustion chamber

was applied, the heating surface was increased to 432 sq. ft. The evaporation with the original firebox, calculated according to Cole's ratios, was 18,004 lb. of water per hour and, after the semi-water-tube firebox was applied, 23,793 lb. of water per hour, or an increase of 32 per cent.

Increased Circulation

Besides increasing the direct firebox heating surface, the semi-water-tube firebox increases the circulation in the side water legs of the boiler and is expected to prolong the life of the side sheets and staybolts. The rapid circulation set up by the semi-water-tube firebox will also act as a safety measure for the crown sheet. A rapid upward circulation is set up, causing an overflow of water onto the crown sheet, which will prevent the crown sheet from being pulled away from the staybolts.

The troughs are so designed that they are free to expand and move in all directions with the movement of the firebox. Opposite the ends of each circulating tube, in both the roof and side wrapper sheets, is a clean-out plug which is removed at washout periods, so that the water tubes can be thoroughly cleaned when the boiler is being washed out.

Brick arches are applied in the firebox. The arch tubes are installed in the usual manner and the arch brick is chipped out to clear the circulating tubes.

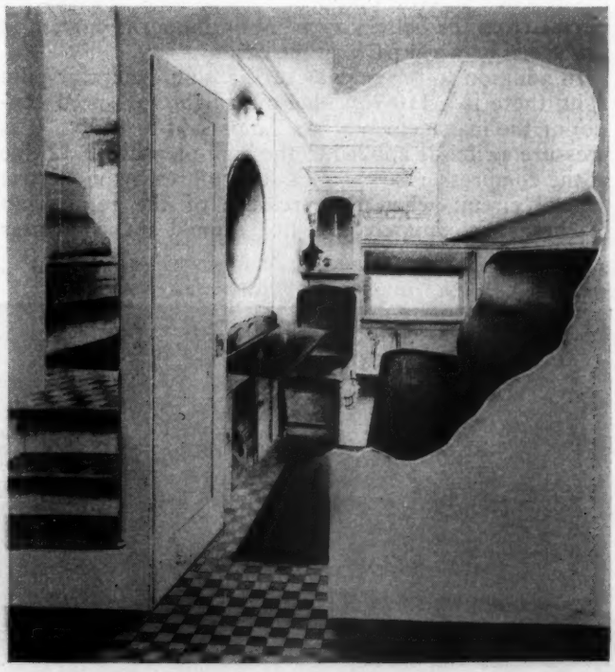
The locomotives to which these fireboxes have been applied are showing a marked increase in steaming capacity and the fireboxes have developed no trouble up to the present time. This design of semi-water-tube fire-box is covered by patents in this country and Canadian patents pending.

Duplex Sleeping Car

A NEW experimental type of Pullman, called the Duplex car, with two single bedrooms on the "ground" floor and two more upstairs, together with 10 standard sections, is now in operation on the Pennsylvania between New York and Akron, Ohio. The interior view tells the greater part of the story regarding this innovation which is an adaptation of the single bedroom ideas with a slight sacrifice of space, but none in comforts. Each room, upstairs and down, has a comfortable lounge for general travel, the back of the seat being turned down to form a spring-mattressed bed at night. Each room has its individual toilet facilities and also its own window, and self-regulating heating and lighting.

Referring to the interior view, the right side of the picture shows the room entered from the floor level, while at the left is the upper room reached by a short staircase. The lower room has a rack for luggage, while the heavier suitcases can be stored under the staircase. In the upper room, luggage is placed in an ingenious cupboard above the couch.

The only change in the structure of the car body itself to accommodate the Duplex-room arrangement was to change the roof from the monitor type to the turtleback type for that portion of the car in which the Duplex rooms are located. This arrangement gives the necessary head room for the occupant of the upper room and also permits the insertion of a window of standard width, but somewhat less than standard height in each room. Windows in the two upper rooms comprise two sash in each, the upper sash being permanent and the lower sash capable of being raised in the usual manner. In the car interior, an offset steel



Interior view showing arrangement of Duplex rooms

Exterior of Pullman duplex-room car

partition divides the lower from the upper Duplex rooms, as indicated in one of the illustrations, which also shows the relative position of the upper Duplex room with the floor elevated three steps above the general floor level of the car. An exhaust ventilator at the center line of the car roof is so connected to each room as to provide ample ventilation.

Air-Conditioned Train on the C. & O.

(Continued from page 176)

ated by remote-control units. If the car temperature drops to too cool a condition, the thermostat opens the circuit to the electric speed control, de-energizing the relay coils and stopping the compressor. At this point, the heating relay, which is tapped into the control circuit after the cooling thermostat is de-energized, closes the electric circuit to a magnetic valve, permitting vapor to flow to the overhead heating coils when the heating thermostat calls for it.

The energizing of the electric speed-control coils is accomplished by current from the car-lighting batteries. The relay is connected between the battery and the drive so that no current is given to the coils until the generator has reached a 5-volt output. This is done to break the circuit from the battery to avoid draining the current at low speed or when parking the car.

In addition to the regular car-lighting generator pilot light, there is a 110-volt blue pilot light for speed control of the management. As Amos said to Andy, 'It is pressure switch is applied to the high-pressure F-12 line in the compressor box. This device breaks the electric control circuit when the pressure of the refrigerant reaches approximately 275 lb. Should the condenser fail to function, the heat developed is not released, with consequent building up of pressure.

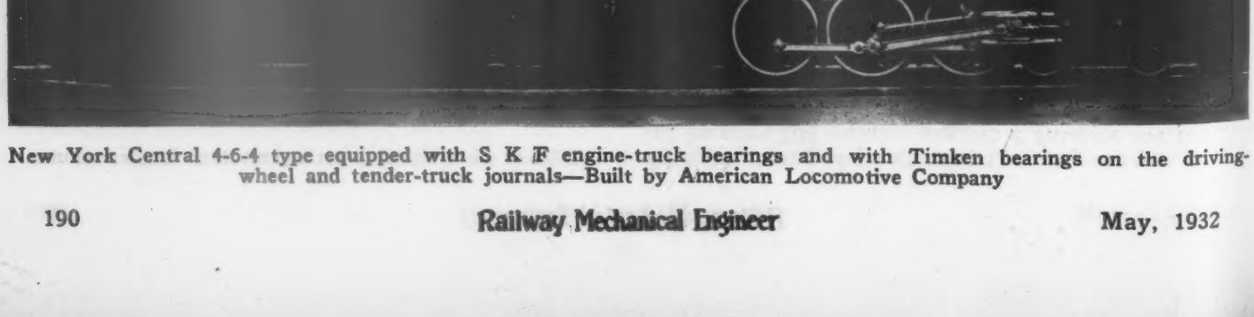
For stand-by service, it is necessary to plug into a 220-volt receptacle located on each side of the car. This automatically closes the control circuit for the electric starter switch, thus starting the stand-by motor and compressors. An overload trip is provided to break the

Interior of the C. & O. de luxe coach showing seating arrangement and interior decorative treatment—The air outlets of grilles are in ceiling

starter circuit, in the event an overload develops. A special plug is required to match the receptacle on the car.

The release and stand-by motor contactor are located in a dust-proof metal box under the car near the motor. The compressor, two condenser coils, one condenser fan unit with high-pressure cutout and an ingenious free-wheeling device to permit the fans to revolve in the proper direction regardless of the direction of car motion, are contained as an assembled unit, which may be readily removed, in case of necessity, from the air-tight sheet-metal container box.

* * * *



New York Central 4-6-4 type equipped with S K F engine-truck bearings and with Timken bearings on the driving-wheel and tender-truck journals—Built by American Locomotive Company

EDITORIALS

Counting Our Blessings

So quickly do we become accustomed to higher and better standards of living that we need frequently to be reminded of some of our blessings, else we may thoughtlessly injure or damage the very processes that make them possible. No more striking reminder of this can be found than in the addresses made at two of the recent meetings of the New York Railroad Club. At the February meeting John J. Mantell, who was retained by the Chinese government to study the railway systems of that country, told of the great natural resources of China, the sorely needed development of which await the building of a more adequate transportation system. At the April meeting of the club Charles A. Gill, former superintendent of motive power of the Baltimore & Ohio, who has just returned after serving a year as chief consulting engineer of the Soviet railways, told of the pressing transportation needs of that country. True, substantial progress is being made in improving the Soviet railways, but they still fall far short of satisfactorily meeting the vital needs of that country.

The United States has built up a wonderful transportation machine, and because of it has enjoyed an industrial and agricultural development far beyond that of any other country in the world. With it has come a corresponding rise in the levels of the standards of living of all of our people. It would seem, therefore, that the government should foster and protect this transportation machine with the greatest jealousy.

The railroads until a few years ago enjoyed almost a monopoly in the transportation field, and even today form the backbone of the country's transport. Not only do they furnish a superior type of service, but, in addition, the heavy taxes paid by them are used to forward the general welfare and improvement of the communities which they serve.

Other types of transportation have been growing steadily in recent years, as the roads and waterways have been improved and since aviation has discarded its swaddling clothes. Today, because of these developments, the health of the railways is threatened, if, indeed, it has not already been seriously damaged. It is not intended to suggest that the railroads should be artificially stimulated, particularly if they are in any way unsound from an economic standpoint. We do not understand, however, why anyone can question the wisdom of subjecting the other types of transportation to the same kind of regulation and taxation. To the extent that this is not now done, these other methods of transportation are practically being subsidized at the expense of the railroads. In other words, the public is paying well for these other services—much more than for railroad service in many instances—although much of the cost is hidden, since the rates to the shipper do not reflect the entire cost of the service to the public.

The situation of the railroads is fast becoming desperate. Will the American people kill the goose that lays the golden eggs? If the railroads are put out of business, to what shall the communities look for the vast amount of taxes now paid by them? Railroad securities valued at billions of dollars are held by public service institutions, such as insurance companies, savings banks, and endowment and trust funds of all sorts, which concern the interests of every citizen. What is to become of these agencies if the railways are forced out of business? Will the other types of transportation, now being practically subsidized by the government, so greatly decrease the cost of living of the average citizen that it will offset the losses involved in the destruction of the railroads?

Car Foremen's Associations Deserve Support

There are approximately ten associations of car inspectors and car foremen distributed at important interchange points throughout the country and devoted to the improvement of the individual members, as well as their respective railroads, through a better understanding of the rules of interchange and car-department problems, in general. Under the stress of present conditions, some of these associations are in a fair way to suspend operations; others have been forced to consolidate meetings or at least the monthly published proceedings; and, in still other cases, the meetings are carried on with difficulty, largely owing to the lack of support from higher officers in the mechanical department. In view of the outstanding service which these associations have performed in the past, as well as the fact that they are largely local institutions whose meetings can be attended by car inspectors and foremen at little, if any, expense, mechanical and car-department officers are justified in lending their fullest support and encouragement to these associations in their effort to maintain membership and programs at a high standard.

Certainly, the need for car foremen's associations as educational agencies was never greater than at present. With car-inspection forces largely curtailed, the responsibility of present car inspectors and supervisors is redoubled and an examination of any representative group of car-repair records will indicate all too little knowledge of the interchange rules, as well as slight appreciation of what the repair records reflect. For example, a record of duplicate air-hose application was recently checked, the first application being on account of a porous hose. The car in question moved on, and the following day another inspector, representing the same road, applied another new hose at the same location, his record also indicating application on account of the old hose being porous. The question is: What inference will be drawn from these two records when they reach the car owner in Tulsa, Okla.? In all probability, the second air-hose renewal was required, owing to a coupler bruising or breaking the hose, but, whatever the explanation, the railroad is open to the suspicion of sharp practice in connection with car-repair billing because one of its inspectors displayed ignorance or carelessness, or both, in making out a bill.

Car foremen's associations are an important corrective influence in preventing the type of car-repair billing described above, as well as providing an improved general understanding of the interchange rules and an incentive to interpret them with a view to expediting

car movement with the least delay and expense to all carriers involved. Membership in these associations, as one member puts it, frequently costs only 8½ cents a month, or less than the price of a good cigar. Car men who are endeavoring to carry on these associations should receive the heartiest support and encouragement from their superior officers.

Passenger Equipment To Be Improved

One thing which the railroads will unquestionably do in 1932 will be to continue the improvement of their passenger-equipment standards, with a view to holding and, if possible, increasing passenger traffic. This is essential from the point of view of passenger earnings, prestige and the fact that satisfied passengers often develop into satisfied shippers, routing freight traffic over their favorite roads. There is every indication that this improvement work will include not only the acquisition of substantially more new equipment than was purchased in 1931, but also the complete renovation, in accordance with modern requirements, of the interiors of many old cars otherwise in good physical condition and not excessively heavy. Obviously, it would be poor economy to rehabilitate cars already obsolete from a weight standpoint, due to the adverse effect of this weight upon possible train speeds and operating costs. Except possibly for air cooling and air conditioning, no modern development in car design is of greater current interest or holds greater promise for future improvements in railway service than the use of light-weight alloys and materials in cars with exteriors designed to minimize wind resistance.

Passenger trains of modern equipment possess potentially the strategic advantage of combining safety, speed, comfort, convenience and relaxation in travel to a degree impossible with any single competitor whether it be motor coach, private automobile or airplane. Rates are, of course, fundamental, and a certain amount of railway passenger traffic has doubtless been permanently lost to subsidized highway transportation. Super-speed requirements favor air transport. The amount of business lost to these and other competing agencies, however, is going to depend, in the long run, largely on the kind and cost of rail service rendered. This fact constitutes a challenge which the railways must meet with the utmost ingenuity within the resources at their command.

While considerable progress has already been made in raising passenger-equipment standards, plenty of room for improvement remains. In spite of the installation in recent years of some of the finest new sleepers, diners and lounge cars, with all modern conveniences, too much old equipment of this type is still far from attractive. Coach-equipment conditions generally are even less appealing to the public. More or less dirty, dingy, poorly-lighted and ventilated coaches, with straight-back, hard seats and no lavatory facilities, are still in daily use, notwithstanding the tendency of reduced traffic to send less desirable equipment of all kinds to the storage tracks.

In view of these facts and the urgent necessity of railways securing their share of the increased passenger traffic bound to come, aggressive managements will not only bend every effort to install new and thoroughly modern passenger equipment, but recondition and bring up to date as large a proportion as possible of existing passenger equipment, particularly coaches. Much of the latter work can be done at relatively little expense, in accordance with carefully developed plans of rehabilitation, decoration and equipment. It is surprising what a great improvement can be effected by replacing archaic window designs and "gingerbread" interior trim with simple lines and panels. Adequate ventilation and heating with automatic control and ample lighting facilities with attractive fixtures are essential. The provision of comfortable seats should by no means be overlooked, preference being given, wherever possible, in coach equipment, to rotating, reclining-back seats.

With either new or reconditioned cars, the interior design, decoration and equipment schemes should obviously be prepared or approved by experts who have had long experience with the tastes of the traveling public. More importance than many railway officers appreciate rests in the selection of the proper colors, fabrics and lighting-fixture designs to harmonize with the general interior treatment. The cost of securing this expert advice is insignificant compared with the probable cost of embarking on ill-advised and expensive programs which will not produce the desired effects.

Maintenance of New Vs. Old Power

It is generally recognized that new locomotives cost less to maintain during their first few years of service than locomotives of practically identical design and construction which have been in service a longer period of time. Just how much this difference in maintenance cost may be is not so commonly known. One of the most interesting and instructive discussions of this subject is presented in an article by Thomas R. Cook in the April issue of "Baldwin Locomotives," which reports the results of a critical analysis of the mileage developed and the maintenance cost of a group of 3,370 representative locomotives on a selected group of carriers over a period of about three years. To facilitate setting up the relative maintenance costs of locomotives of different ages for purposes of comparison, a "horsepower unit" was adopted, equivalent to 10,000 horsepower-miles. If the cost of repairs is approximately one-tenth mill per horsepower-mile, the average cost of repairs per horsepower unit would, therefore, be approximately one dollar.

Some highly significant conclusions can be drawn from the graph of mileage and cost trends presented in Mr. Cook's article. The average trend line for repair costs, plotted against locomotive age, rises rapidly from $.44 the first year to $.82 during the third year, crosses the dollar line at the eighth year and from then on increases at the rate of $.036 per horsepower unit per year to $2.20 during the forty-first year. If $1.07 is assumed as the average annual cost for the first 20 years of motive-power life, this is equivalent to an increase of 3.4 per cent, or $340,000 increase per year, assuming an annual locomotive maintenance cost of $10,000,000.

The graph, indicating mileage trends, shows a general gradual decrease from an average of 39,000 miles per year in the first year to 6,000 miles in the forty-first year, due to the transfer of power to less and less important runs, starting in main-line and ending in branch-line service. It is not anticipated that a reduction in mileage as rapid as that occurring with this group of locomotives will be experienced in the future as

many modern, heavy locomotives can never be used in branch-line service even when old.

On the basis of these curves, representing the average of all roads studied, the article indicates that with the savings due to repairs only, new locomotives installed to replace those 20 years old will repay the investment with 5 per cent interest in 17 years. Under special conditions, new locomotives may replace locomotives less than 20 years and repay the investment in 10 years, or less. Entirely aside from the savings in maintenance, the installation of new locomotives effects improvements in operation, as well as additional savings by the re-assignment of replaced power and the retirement of older obsolete locomotives. Wide variations in operating conditions justify development of the most careful studies by mechancial-department officers to make sure that the type of power best adapted to each particular run on any given road is available and assigned.

Railway Research

The wide interest which some of the recent results of research in the field of pure science have aroused and the sweeping nature of their implications have imparted to the term "research" a sort of magic in the popular imagination which may be invoked to arrive at a sure solution of all the problems of industry. This strong appeal to the imagination has been strengthened by the fact that certain large units of industry, particularly in the electrical and automotive fields, have extensive research departments which are engaged in extending the frontiers of scientific knowledge, as well as on the more practical engineering problems pertaining to the development of commercial products. Hence, the question frequently arises in one form or another, "Why doesn't the railroad industry have a strong centralized research department?"

The popularity of the term "research" has caused it to be very loosely used to lend dignity to any kind of investigation or survey undertaken to bring together a group of facts on almost any conceivable subject. Those who propose a centralized research organization for the railroads, however, usually have in mind a laboratory manned by engineering specialists prepared to undertake both investigations of the fundamentals of design and operation of equipment as well as the more practical problems of the relative merits of competing devices and materials which the railroads buy. Such an organization would presumably be ready to undertake the answer to any technical problem which might be presented to it by the railroads as a whole acting through the American Railway Association.

Such a program, however, overlooks the fact that the solution of the engineering problems of the railroads is not strictly a matter for the railway industry, since the railroads in America produce very few of the materials or equipment which they use. Those who base their suggestion for a centralized research organization for the railroads on what is being done in other industries also overlook the fact that these other industries with research organizations are the producers of equipment or service for sale, each with a group of relatively specialized problems, while the railroad industry is a purchaser of material and equipment from a wide variety of industries and that its own centralized research organization would necessarily have to deal with a range of problems cutting across the specialized fields of almost every type of engineering.

The railroad problems are those of the user of things in the development of which the engineering talent of many industries has contributed, and its engineering problems involve questions of operating methods entirely outside of laboratory technique.

With the extensive agencies for engineering research already available in industries, engineering societies and colleges, a centralized organization for the railroad industry would involve unnecessary duplication. As M. J. Gormley, executive vice-president of the American Railway Association, pointed out in a paper read before the April meeting of the Western Railway Club, the needs of the railroads are better served by confining their centralized activities to specific investigations of problems requiring united action as these problems arise. Where these problems involve materials or equipment manufactured by other industries, the cooperation of these industries with facilities and advice are available and have been utilized, as have also the facilities of engineering schools.

NEW BOOKS

MECHANICAL WORLD YEAR BOOK, 1932. *Published by Emmott & Company, Ltd., Manchester, England. 361 pages, 6½ in. by 4 in. Price, 1 shilling, 6 pence.*

The 1932 edition of the Mechanical World Year Book contains a new section on Electric and Gas Welding and Cutting. The sections on Tooth Gearing, Metals and Alloys, and Structural Engineering have been entirely rewritten and enlarged, and the remaining sections on Steam Boilers, Internal Combustion Engines, Belt Conveyors, etc., have been brought up to date.

INDEX TO A.S.T.M. STANDARDS AND TENTATIVE STANDARDS. *Issued by the American Society for Testing Materials, 1315 Spruce street, Philadelphia, Pa. 121 pages, 6 in. by 9 in.*

This index is designed to be of service to those familiar with the standards of the American Society for Testing Materials in locating any specification or method of test in the bound publications in which it appears. It is also intended for those interested in ascertaining if the Society has issued standards on a specific subject. It is a combined index to the 443 A.S.T.M. standards and 180 tentative standards in effect as of September, 1931. A price list gives the prices of the bound publications in which the standards and tentative standards appear and the prices of standards in separate pamphlet form.

DIESELMASCHINEN V (DIESEL ENGINES). *Special edition of the V.D.I.-Zeitschrift, 1930. Published by the Verein Deutscher Ingenieure, Berlin, Germany. 158 pages, illustrated. Price, paper cover, 7.50 marks.*

This handbook contains 37 articles. It includes the most important articles on Diesel engines which have appeared in the Journal of the Verein Deutscher Ingenieure, as well as papers read before the sectional meeting on Internal Combustion Engines at the seventieth annual convention of the Verein Deutscher Ingenieure and other articles not previously published. Six articles are devoted to automobile engines: two to Diesel locomotives, and three to marine engines. Other contributions deal with thermodynamic researches, investigations on the operation of engines and on fuel injection, with accessories and individual parts, etc.

THE READER'S PAGE

A Question on Coupler Repairs

To the Editor:

It appears to be impracticable to make proper repairs on certain cars. A.R.A. Rule 3, Sec. c, Paragraph 2, requires all cars built after November 1, 1920, to have A.R.A. Type D, 6-in. by 8-in., or Type E, 6¼-in. by 8-in., shank couplers. There have been quite a number of cars built since then with Type D heads having 5-in. by 7-in. shanks, and 8½-in. butts, and so stencilled.

What I should like to know is how to make proper repairs to these cars when they are under load, it not being practicable to transfer the load or hold the car to get material from the owner.

Could we apply an A.R.A. Type D coupler, 5-in. by 7-in. shank, 9⅛-in. butt, and an A.R.A. yoke and charge the owner for betterment, or would we have to apply an A.R.A. 6-in. by 8-in. shank to get paid for our time and material?

W. E. Hogbin

Firing-Up With Oil Torches

To the Editor:

The article on "Smokeless Steaming in the Enginehouse," by R. J. Needham, appearing in the April issue of the *Railway Mechanical Engineer*, states that "The average amount of oil used per locomotive steamed up is somewhat less than 36 U.S. gal." and that all these locomotives are brought up to a pressure of from 140 to 150 lb. by means of the oil torch method described. While the author hastens to add that "Of course, they are not all brought up to pressure from a cold condition," the article gives an impression which I am sure Mr. Needham did not intend.

The quantity of fuel oil required to steam up a locomotive depends upon the size of its boiler, as well as upon the temperature of water with which it is filled. Three of the largest oil-burning railroads have made very thorough tests to determine the exact quantity of oil required to generate steam pressure on locomotives in comparison with the Direct Steaming method. The following figures are taken from these tests:

Southern Pacific—Los Angeles Tests	
Size of locomotive boiler, approx.	5,000 gal.
Temperature of filling water, average	150 deg. F.
Locomotive oil consumption to generate 150 lb. pressure	134 gal.
Texas & Pacific—Ft. Worth Tests	
Size of locomotive boiler, approx.	6,000 gal.
Temperature of filling water, average	200 deg. F.
Locomotive oil consumption to generate 125 lb. pressure	106 gal.
Size of locomotive boiler, approx.	3,000 gal.
Temperature of filling water, average	200 deg. F.
Locomotive oil consumption to generate 125 lb. pressure	73 gal.
Atchison, Topeka & Santa Fe—Emporia Tests	
Size of locomotive boiler, approx. (shell cold)	4,000 gal.
Temperature of filling water, average	205 deg. F.
Locomotive oil consumption to generate 100 lb. pressure	62 gal.
Same boiler (shell hot)	
Temperature of filling water	190 deg. F.
Locomotive oil consumption to generate 100 lb. pressure	55 gal.

Since the article in question suggests comparison with Direct Steaming, it is pertinent to note that several oil-burning roads are using this system in preference to firing up locomotives with oil in a territory where oil is obtainable at very low prices. It is also pertinent to observe that the pressure type of oil torch, as recommended in this article, requires constant attention and can produce a very smoky flame unless skillfully handled. Experience indicates that a vacuum type of oil torch is much less objectionable in this respect. Furthermore, the vacuum type torch does not present so great a fire hazard as oil hose under pressure in the enginehouse.

L. G. Plant,
President, Railway Engineering Equipment Company.

How Do Bill Brown and Top Sergeant Feel Now?

To the Editor:

The April issue of the *Railway Mechanical Engineer* arrived yesterday shortly after lunch. It was a warm spring day and I had eaten heavily. Drowsily I leafed the pages over until I came to No. 150 on which was your editorial "The Price Will Be High." With some difficulty I kept awake while I read it through to the end. Then I fell asleep. And as I slept, I dreamed a dream.

I dreamed that I was standing in Bill Brown's shop. All the men were gathered together. The band was there in its bright uniforms. It had just marched in playing "I've Been Working on the Railroad," with the accent beat on the "been." Bill Brown, with his clarinet under his arm, and the look of Joan of Arc in his eyes, stepped from the ranks and made the following address:

"Fellows, it is with the deepest regret that I have to tell you that, beginning next Monday, the shops will be closed down for an indefinite period. Of course, you appreciate that this most unfortunate event is due to business conditions which are entirely beyond the control of the management. As Amos said to Andy, 'It is sure too bad that we have hard times coming on when we already have a depression.' (Laughter.) It is too bad that you who have served the company loyally and well must suffer. However, I know you fellows will appreciate the fairness of the management when I tell you that we foremen and supervisors are also being laid off until further notice, so we are all in the same boat. (Applause.) Let's show that our hearts are in the right place by giving three rousing cheers for the old X. Y. & Z., after which the band will play 'Auld Lang Syne'."

As the happy crowd adjourned, my dream angel carried me to another shop and deposited me in front of the shop bulletin board. Top Sergeant was posting a notice. He had no thumb tacks, so he was taking down the last safety poster and using the tacks to secure the new bulletin, which read: "Beginning Monday, April 11, these shops will be closed until further notice."

"There," he muttered to himself, "that was the hardest job I ever had to do." The old Top Sergeant walked back to his little cubby hole of an office with his head down and looking not to the right nor to the left as he ambled along the shop aisle. Sitting down at his desk he started checking over his work reports.

I was awakened from my dream by the jangling of the 'phone. Engine 529 was a mile east of ND tower with a loose tire. However, that editorial made me think of the Bill Brown-Top Sergeant controversy back in '25 and '26. Wonder how they feel now?

F. O. Reman.

With the Car Foremen and Inspectors

Car-Repair Costs Cut

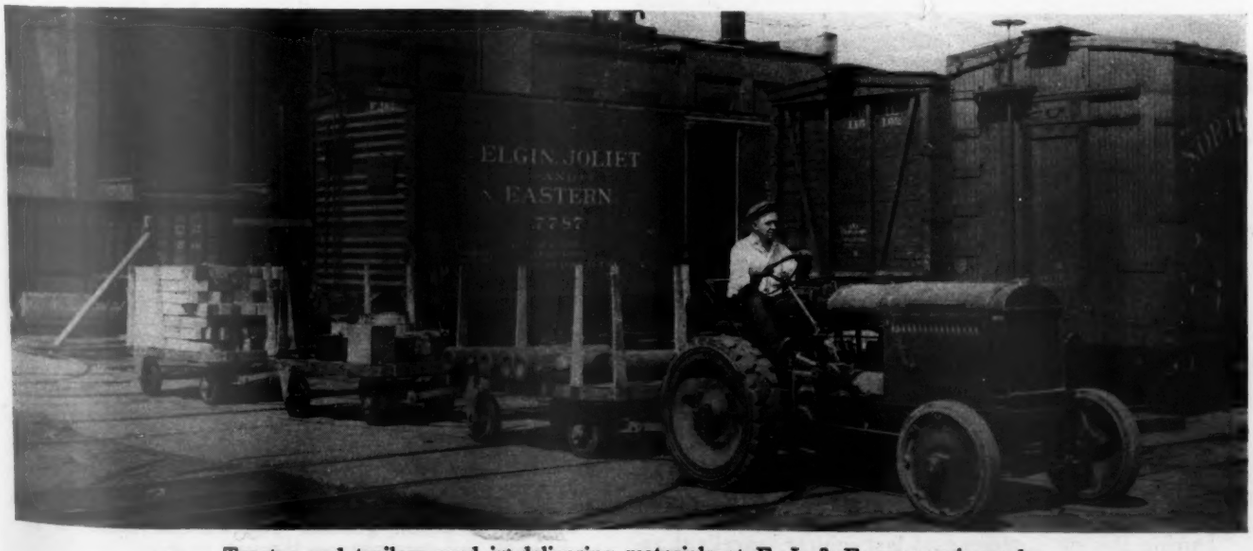
THE possibilities of modern trackless equipment and hard roadways in reducing costs at car-repair shops and rip tracks is well illustrated by the results with this equipment at the Kirk yard (Gary, Ind.), of the Elgin, Joliet & Eastern. As shown subsequently in this article, an estimated gross annual saving, less interest, depreciation, maintenance, etc., of $34,118 is to be compared with a total cost for trackless equipment and concrete roadways of $27,179.

Material-handling equipment used at Kirk yard includes 1 magnet crane, 1 lift truck, 2 tractors, 1 hand platform truck, 2 lumber trailers, 20 rubber-tired truck trailers, 35 steel platform boxes, and 125 steel platforms, 33 in. by 54 in. All of this equipment is used in handling materials and assisting in repairing cars at this point. At Gary, the magnet crane and two tractors are assigned to the car shop, where the magnet crane handles all wheels, bolsters, truck sides, and all heavy material used in repairing cars, the first three hours being spent in using the magnet to pick the scrap off of the repair tracks. The two tractors with trailers deliver all kinds of material wanted at the cars being repaired. The tractor drivers get their orders from the assistant foreman and then give the orders to the stock men at the car shop and the platform dock. The material is loaded on trailers and is then dispatched to the job. Order boxes are installed throughout the shops and repair tracks and as the drivers pass the boxes the orders are picked up. The lift truck is assigned to the storehouse and back shop. The operator unloads all skid boxes from cars and delivers them to the proper place for that class of material, and in the back shop he makes regular deliveries of the material called for in his orders. This work is all done on schedule time at the storehouse. All the material possible is loaded on platform skids and is used out of these containers.

When this equipment was installed in June, 1930, it released four laborers at the storehouse at a saving of $360 per month, and also dispensed with 112 man-hours per day in the car department, which is equivalent to a saving in car-department labor of $77.22 per day, or $2,007 per month, bringing the total labor saving to $2,367 per month. The labor saving of 112 man-hours per day includes 74 hours' work of car repairers previously required in taking car wheels from the car by hand to the wheel shop and returning with new wheels. Now a magnet crane delivers two pairs of wheels in 10 minutes and eliminates all danger of accidents, as the crane takes the old wheels off the rails and places the new wheels on the rails under the truck. The car men do not handle the wheels until they are on the rails ready to roll under the trucks.

Skid and power truck used in handling scrap engine wood

The next big saving at Gary was in the handling of engine wood. Prior to January, 1931, the mechanical department always had two laborers cutting wood for

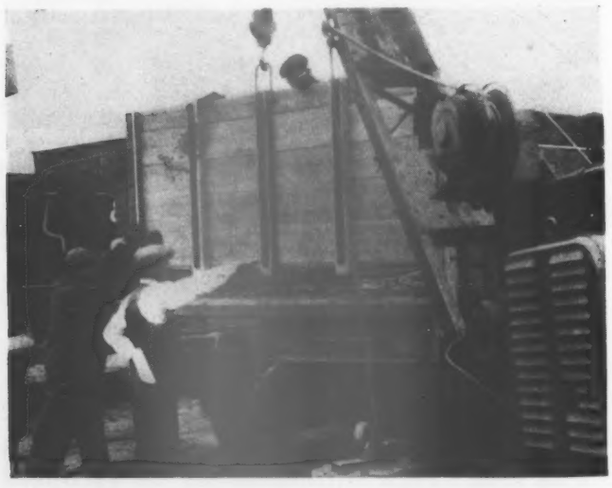


Tractor and trailers used in delivering materials at E. J. & E. car repair yard

lighting fires in locomotives. This scrap wood is now picked up from the car-repair tracks, loaded on trailers, and sent to the wood shop for cutting. This wood is cut during the spare time in the wood shop, where it is loaded on trays and delivered every night by a lift truck to the enginehouse for use. The empty trays are returned to the wood shop the next morning. Previously, the wood was picked up on the repair tracks, placed on a push car and then loaded into a gondola car, which was switched to the wood saw where the wood was unloaded and sawed to size, and then piled at the wood saw. When the wood was needed, it was again loaded in a car and switched into the enginehouse. The use of skids eliminated all of this extra handling of engine wood at a labor saving of approximately $200 per month to the car department by eliminating two laborers.

One of the pictures shows a magnet crane handling one dump door weighing 1,188 lb. Previously it required six hours' work by car repairers and one hour's work by helpers, at a cost of $5.08 per day, to apply one door, while the work now requires 30 minutes of labor from a truck operator, 30 minutes of a car helper and 20 minutes of a car repairer, at a cost of 90 cents per day, which is equivalent to a labor saving of $4.18 per door handled.

In a similar manner, the work of handling and placing one end gate on a gondola car has been reduced from 1½ hours' time of a car repairer and an hour's time of a helper, at a cost of $1.71, to 10 minutes' time of a truck operator and 10 minutes' time of a tractor driver, at a cost of 21 cents, netting a saving of $1.50 on each end gate handled.



Crane truck used in applying heavy gondola car end gate

Truck bolsters weigh 858 lb. each. It previously took four hours' time of a car repairer and one hour's time of a car-repair helper, at a cost of $3.58, to handle one bolster by hand, while a magnet crane operator now does the work in 20 minutes at a labor cost of 24 cents.

Truck sides weigh 445 lb. each. By reducing the labor from one hour's time of a car repairer and a half-hour's time of a car-repair helper, at a cost of $1.04, to 20 minutes' time of a truck operator, costing 24 cents, a magnet crane saves 80 cents per truck side handled. A magnet crane also saves $12.27 per day at Gary by reducing the work of laborers from 32 man-hours', at a cost of $14.40, to 3 hours' work of a truck operator at a cost of $2.13.

During the snow storms of last winter, excellent results were obtained with snow plows pushed by tractors. During one of the most severe storms, the plows were tested on the repair tracks. Within one hour after starting to work, all roadways were open and the work of delivering material begun. When the snow was shovelled, it took half a day to set the material-handling work in full motion.

Type of magnet crane used in handling car wheels and scrap

Hand methods of clearing the roadways on the repair tracks of snow required 12 laborers, 7 painters and 8 painter helpers at a cost of $61.82, while the tractor methods required only 2 hours' time of the operator and 6 hours' time of a laborer at a cost of $3.78.

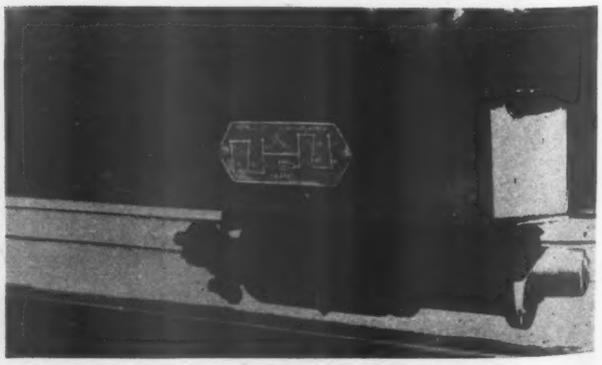
The full saving of labor at Gary, with this equipment, cannot be estimated, but the measurable savings in the aggregate are shown in the table.

Labor Saving by the Use of Trackless Equipment at Kirk Yard

Total cost of all equipment			$16,244
Concrete roadways			10,935
Total			$27,179
Gross annual savings		$39,823	
Less 10 per cent depreciation	$2,717		
Less 5 per cent maintenance, taxes and insurance on investment	1,358		
Less 6 per cent interest on investment	1,630	5,705	
Net annual savings			$34,118

It will be seen that the annual saving credited to the work more than exceeds the cost of the initial investment, including the concrete roadways.

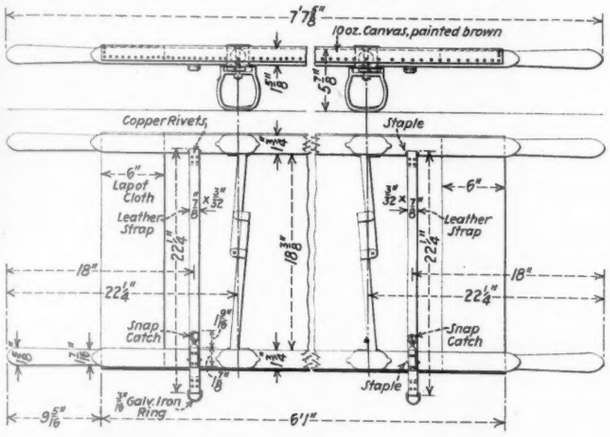
* * *



Type of malleable-iron brake-lever badge plate applied to Chicago & Alton gondola—Applications made to all cars passing through shops

Folding Stretcher for First-Aid Departments

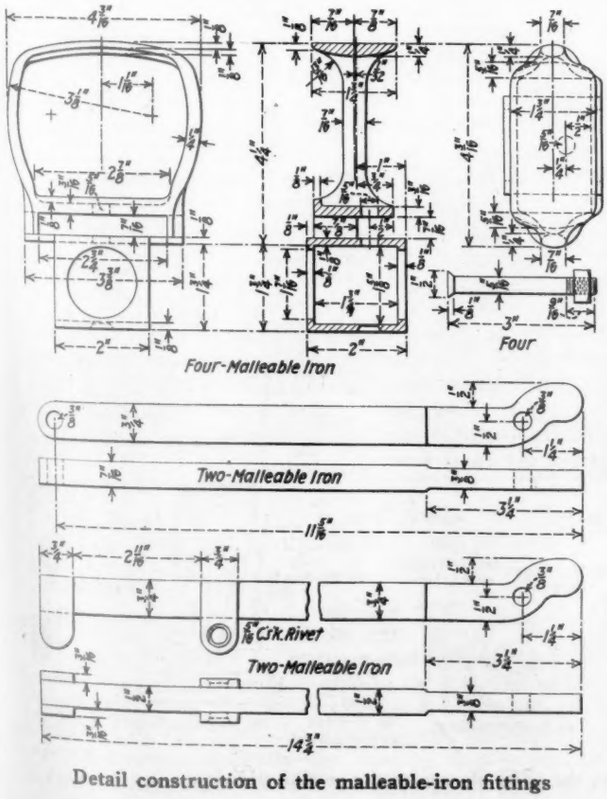
ACCIDENTS will happen in the best regulated shops. For that reason the first-aid or safety departments of a well equipped shop usually have folding stretchers located at strategic points around a shop or repair yard for the handling of those so injured that they are unable to walk. The folding stretcher shown in the two drawings can be made in the carpenter and



Assembly drawing showing the construction and folding arrangement of the stretcher

smith shops, if forgings are substituted for the malleable-iron parts. Stretchers of this design are also part of the equipment issued to passenger and freight stations, warehouses, office buildings, etc.

The wood side rails and handles are of seasoned white ash or hickory. Ten-ounce canvas duck, painted brown, is tacked to the side rails with upholstery nails. Leather shoulder straps, 3/32-in. by ⅞-in., are provided at both ends, as shown. The stretcher is 6 ft. 1 in. long by 18¾ in. wide. The length overall is 7 ft. 7⅝ in. The height from the floor is 5⅞ in.



Detail construction of the malleable-iron fittings

Handy Wagon for Transporting Cutting Outfits

THE wagon shown in the photograph was designed for handling oxygen and acetylene tanks around the smaller car-repair yards, especially at rip tracks where light running repairs are made to passenger cars. The amount of cutting at these points is not sufficient to

A portable truck for welding equipment that can be handled by one man

warrant the expense of piping gas through the yards, however, it is necessary to have a cutting torch available many times during the day for removal of bolts, etc.

Wheels of 30 in. diameter are used and one man can move the wagon across a rail if necessary without assistance. The frame is made from 1½-in., by 1½-in. angle and can be riveted or electrically welded.

A metal box as shown at the top of the wagon is provided for torch tips, wrenches, goggles, etc.

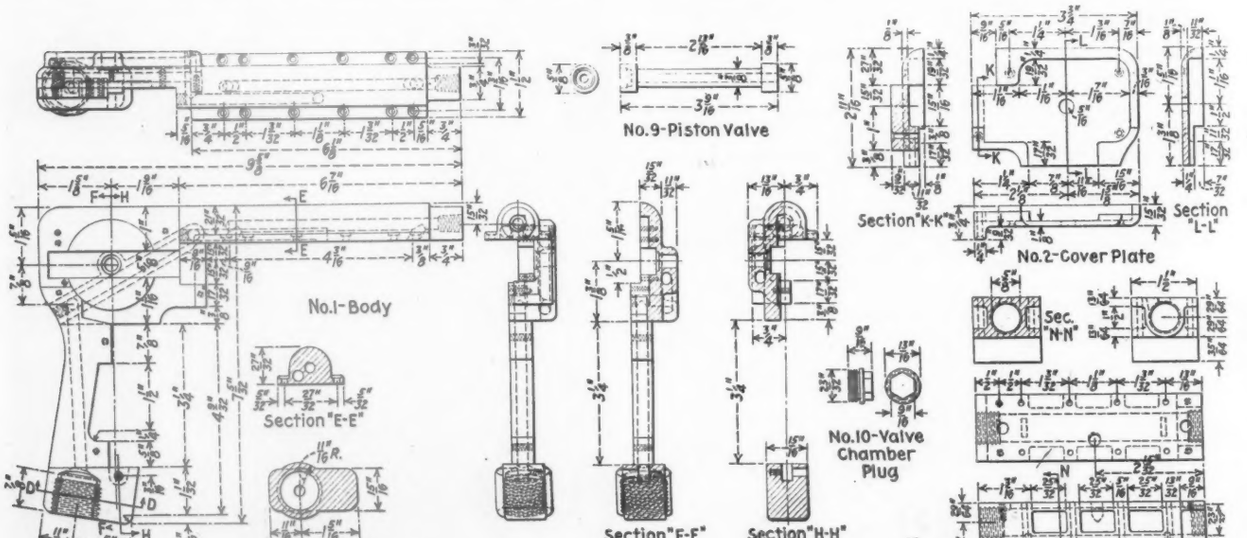
Gun for Injecting Free Oil

SHOWN in the two drawings is the general assembly and details of an oil gun designed for injecting free oil into the journal boxes of cars as they pass over a hump. It is the usual practice when using this gun either to have the inspector raise the lid while inspecting the cars or to have a man stationed on each side of the track who raises the lids before they arrive at the oiling point. The lids are closed as the car proceeds along the track from the hump.

The gun consists of a total of 34 parts, of which 31 are different. Two piston rings, two measuring-cylinder plugs and two hand grips, one right and one left, are required.

The handle portion of the body is tapped for a hose connection to a portable oil-supply tank, which can be easily moved where desired. An oil passage in the handle leads directly from the hose connection to the valve, which is operated by a trigger mechanism.

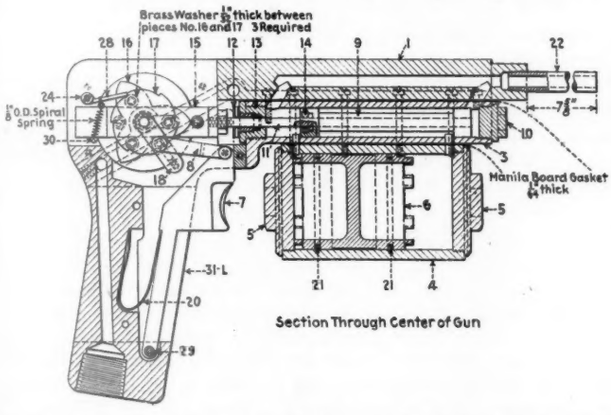
Pressing the trigger *7* against the trigger spring *20* causes the trigger link *8* to depress the rachet lever *18* and rotate the ratchet wheel *17* forward. The ratchet wheel rotates the star wheel *16*. The pawl notches on the ratchet wheel are located 60 deg. around its circumference, while the points of the star wheel are at 120 deg. The camed surface or pitch line of the star wheel engage the heads of two round machine screws on the valve-control slide *15*. With the valve-control slide in forward position, the front screw head is in contact with a point of the star while the rear screw head engages the star wheel at the lowest point of the pitch line. The lowest and highest points on the pitch line are 60 deg. apart. Thus one stroke of the valve-control slide is accomplished by a 60-deg. turn of the star wheel and ratchet.



Detail parts of the oil gun—The numbers refer to the parts shown on the section drawing

The valve-control slide *15* is connected directly to the piston valve *9*, which moves in the valve chamber *3*. Two ports at either end of the valve chamber lead to the barrel of the oil gun and to the measuring cylinder. The ports to the measuring cylinder are spaced $3\frac{3}{16}$ in. apart, while the ports to the barrel are spaced $4\frac{3}{16}$ in., a difference of 1 in. between the center line of the two port openings in the valve chamber at either end.

The piston valve *9* is made in the form of a spool $3\frac{9}{16}$ in. long and with ⅜-in. slides. Oil is admitted to the valve chamber through a port which is located in the top of the chamber and midway between the two ends. With the piston valve in forward position, as shown in the drawing of the section through the center of the gun, the front port to the measuring cylinder is uncovered by the valve, while the port to the barrel is blanked off. A similar arrangement of port openings but reversed with respect to the ends of the cylinder, is effected at the opposite end of the stroke.



Section Through Center of Gun

Section through the center of the gun for injecting free oil into journal boxes

The oil from the supply tank is admitted to the measuring cylinder via the hose and an oil passage through the body of the gun to the center of the valve chamber *3*.

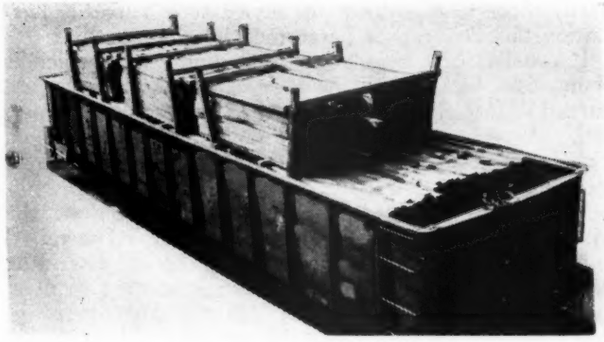
This causes the measuring-cylinder piston *6* to move to the rear, forcing the oil out via the rear port, through the uncovered end portion of the valve chamber and through port to the barrel of the gun. A barrel extension *22* of ⅛-in. wrought-iron pipe is screwed into the end of the barrel to insure greater accuracy.

The length of the measuring-cylinder piston *6* determines the quantity of oil disbursed at each shot. Two pistons are provided for this gun, one for a capacity of ¼ pt. and the other for 1/10 pt. The former is ¾ in. between piston faces and the latter is 2⅛ in., with the other dimensions of the piston made to suit. The piston rings are charging-valve piston rings for a Westinghouse U-12 universal valve.

Oil is fed to the gun from the tank by pressure from the shop or yard air line.

Why Does Lumber Shift?

THERE are probably hundreds of car inspectors who would have little difficulty in determining the actual cause of the lumber shifting on the car shown in the accompanying illustration, yet the car inspector who accepted this car from the lumber yard for movement over his railroad evidently saw nothing wrong with this method of loading. He was wholly responsible for the delay to the load as well as the additional expense to the railroad in rearranging the load and securing it safely for further movement.



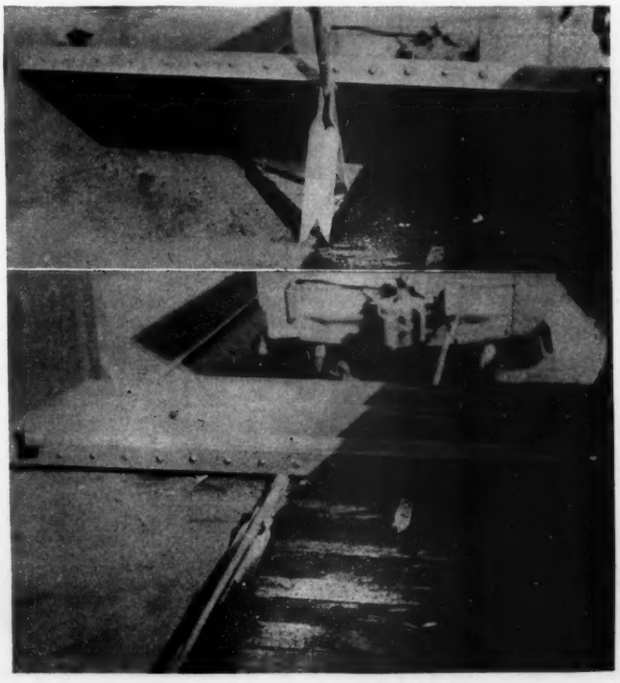
It is easy to see what is wrong with this load

The car is only 36 ft. inside length and it can be readily seen that the three piles of lumber account for but three fourths of the car's length, therefore the lumber is shorter than 10 ft. lengths. A.R.A. loading rule 101 requires that "Lumber or timber less than 12 ft. in length should not be loaded on flat cars or above the sides or ends of gondola cars, except when loading lumber of mixed lengths, the minimum length of short pieces must not be less than 10 ft."

Loads of this nature are dangerous to handle as pieces of the lumber are liable to protrude far enough to come in contact with trains moving on adjacent tracks.

Closing Gondola End Gates

ASK any car inspector in the train yard how many men are required to raise an end gate from the floor of a gondola and set it into place and he will probably tell you that it requires not less than two and ordi-



The end gate partly raised

narily three men. With the device shown in the illustration this task can be performed by one man.

It consists of a regulation track lining bar, which is about five feet long. A ½-in. hole is drilled (not burned) through the bar about 18 in. from the chisel end. A piece of ½ in. by 4 in. wrought iron, 18 in. long is formed as shown and is attached to the bar by a steel pin or rivet.

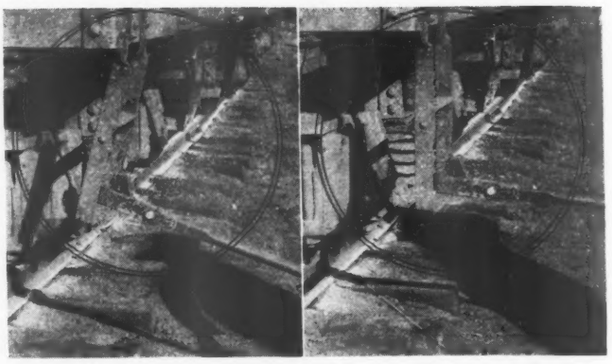
When the end gate is lying on the gondola floor, the bar is forced under the edge about 15 in. and is raised until the end gate is approximately 12 in. from the floor. The car inspector then secures another grip on the bar, preferably by placing his shoulder under it, and raises the end gate upward until it is about 15 in. off the floor. With the weight of the end gate on the bar it will remain in this position until the car inspector grasps the end gate itself and raises it into an upright position. After the end gate is raised off the car floor about 12 or 15 in. no difficulty is experienced in pushing it to an upright position.

Tool for Straightening Safety Appliances

MANY safety appliances, especially grab irons, sill steps and ladders are broken by car inspectors during the process of straightening which necessitates sending the car to a "rip track" to have the rivets removed and a new part applied.

An efficient tool for car inspectors in the train yard for straightening these parts without heating them is shown in the accompanying illustrations. The purpose of the tool is to remove the bend in the safety appliance without causing distortion or placing a strain on the entire appliance.

A piece of tool steel 1¼ in. by 30 in. in length is formed as shown, the square end being curved 6 in. and the section resting against the grab iron being grooved sufficiently to prevent slipping. A lacer made from ¼ in. by 2½ in. flat wrought iron having two holes drilled about 1½ in. apart for adjustment is attached to the curved end of the bar with an ordinary bolt or a pin. The strain upon the lacer will hold the bolt in place without the use of a lock nut.

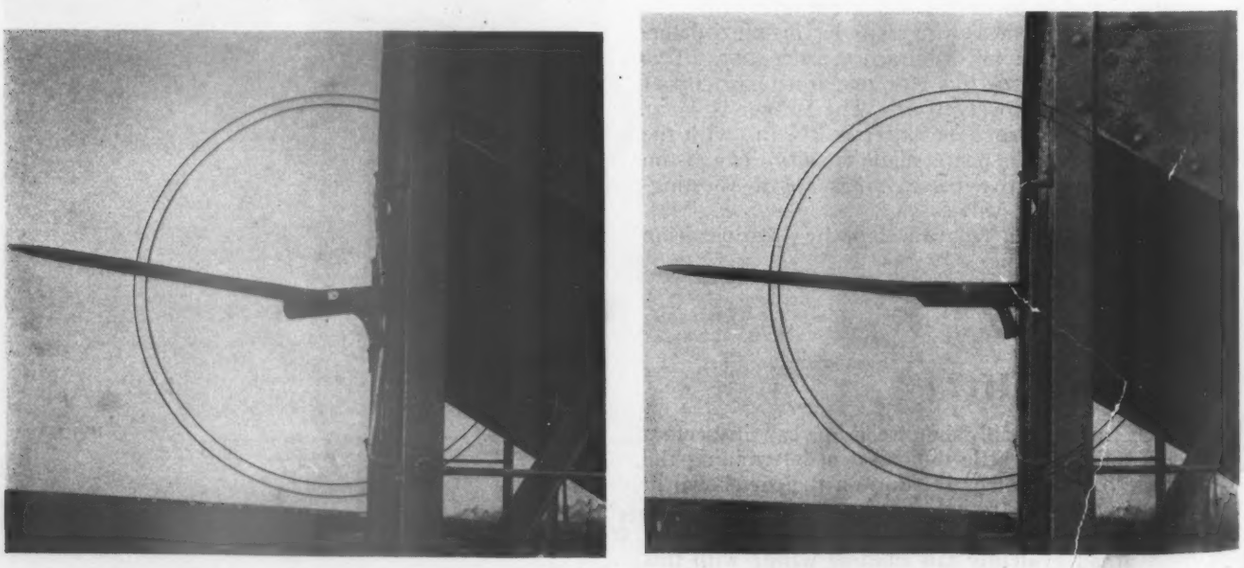


Left: A bent car step, showing how the tool is applied—Right: After being straightened

One railroad has adopted this tool as part of the car inspector's standard equipment and its use has greatly facilitated the reduction in safety-appliance defects for which it was formerly necessary to send cars to repair tracks. Coupler uncoupling levers and hand-brake shafts can also be straightened by increasing the length of the leverage by the temporary use of a section of pipe.

ADJOINING FREIGHT CARS WITH SAME NUMBER.—Recently the Gulf States Creosoting Company plant at Meridian, Miss., loaded two flat cars with telephone poles for a consignee at Quinlan, Okla. There was nothing unusual about that, but there was something distinctly unusual in the fact that one of the cars was M&O-70416 and the other IC-70416. If you are good at mathematics, you might try figuring out the chances of two cars with the same numbers being coupled together in a train again.

THEY DON'T KNOW WHERE THEY'RE GOING BUT THEY'RE ON THEIR WAY.—Perhaps the railroads in this country have been mistaken in looking for passenger business among people who know where they want to go. One of the enterprising railways in England is going after business from another angle. It is running a series of special trains, particularly for hikers, to destinations which remain a mystery to the passengers until the trains are under way. All the passengers need is a little money and a lot of curiosity. Their itineraries are handed to them after the trains have started. On the first trip, during the Easter week-end, more than 2,000 passengers crowded the two sections of the special train.



Two views showing how the tool is used for straightening a grad iron—Left: Before—Right: After straightening

In the Back Shop and Enginehouse

Oxyacetylene Shape Cutting Effects Large Savings

THE extent to which oxyacetylene shape cutting, with equipment varying from the hand-operated torch to the automatic, multiple-torch, shape-cutting machine, has revolutionized railroad shop practice, with attendant economies, is generally recognized. Not all shops are provided with the proper equipment, however, to capitalize fully on this modern method of manufacture and some of the illustrations shown in this article will, therefore, be of interest, and the comparative cost statements possibly suggestive of the tabular set-up best adapted to justify the installation of necessary new machines.

In one average-sized railroad shop which, under normal conditions, does a considerable amount of manufacturing of parts for the system, an extensive survey and statement was made of the work which could be done economically on an automatic shape-cutting machine. Forty-four individual items were shown on this statement,. varying all the way from large nuts and wrenches to locomotive rods and front-frame sections. The largest single item, from the point of view of numbers, was 1,000 freight brake levers, to be manufactured annually at a net saving of $1,190 as compared to previous forging methods. Five hundred offset follower plates were called for annually at a net saving of $1,915. A total of 480 crown-bar braces were required annually at a saving of $127.20, and 240 piston-rod nuts at a saving of $100.80. The largest single estimate of annual savings was $1,971 for 150 passenger stirrup-spring hangers. The total savings, exclusive of material, were estimated in this statement to be slightly in excess of $11,000 per annum.

Referring to automatic shape cutting in general, the average range of saving over previous forging methods varies from 10 to 25 per cent, although in some cases where a large amount of machine work is eliminated, maximum savings reach 60 per cent or more. On many parts, the shape-cutting machine leaves the surfaces sufficiently accurate so that the parts can go into service immediately without subsequent machine work. With practically all locomotive parts, pre-heating is required before cutting and normalizing afterwards. In some cases, such as locomotive motion work, sufficient stock must be left for machining all over. Local shop conditions also govern, to a considerable extent, in determining what economies can be effected by the installation of shape-cutting machines. In general, maximum results will, of course, be obtained in those shops most poorly equipped as regards modern forging machinery and heavy-duty milling machines. In any shop, however, substantial savings can be shown owing to inherent advantages in this relatively new manufacturing process.

As a rule, it has been found best to locate the shape-cutting machine in the blacksmith shop for the reason that, when not used on production work, the blacksmith foreman often finds it convenient to use the machine for many small jobs such as the trimming of billets and forgings being handled under the big steam hammers, making large washers and nuts and many other fill-in jobs. The type of templet used with the auto-

Modern shape-cutting-machine installation—Note excellent light; also overhead crane serving narrow-gage tracks to adjacent car bottom furnace

matic shape-cutting machine is illustrated and comprises a steel plate, usually ⅛ or $\frac{3}{16}$ in. in thickness, provided with ¼ in. by $\frac{7}{16}$ in. aluminum templet strips, laid on edge and riveted to the steel plate with tubular brass rivets. A grooved wheel, power-driven, in the guiding head of the shape-cutting machine then follows the templet automatically and assures a uniform cutting job. The thickness of material cut with this machine vary from as low as $\frac{3}{16}$ in. to as high as 18 in.

Savings Shown in Comparative Cost Statements

Referring to the first statement in Table I of comparative manufacturing costs of one front-frame section cut from the billet, it will be observed that the detailed costs, using the oxyacetylene shape-cutting method, are set up in the left column and the detailed costs, using the previous forging method, in the right column. Since the frame section was cut direct from the billet, no preliminary smith-shop work was required with the shape-cutting method, and this saved almost $14. The labor, material and overhead expense for the shape-cutting operation was $2.69 and only a slight amount of subsequent slotting, presumably of the frame jaw, was required, costing about $7, as compared to $19.25 for machining required by the previous method. After deducting scrap allowances, the table shows that the total saving effected by the use of the shape-cutting method over the previous method was $23.71.

Table I—Comparative Manufacturing Costs—One Front-Frame Section, Cut from Billet

Shape-Cutting Method— Smith Shop		Previous Method— Smith Shop	
Material, 450 lb. at .021	$ 9.45	Material, 450 lb. at .021	$ 9.45
Stores, 6 per cent material	.57	Fuel, 360 lb. at .001604	.58
Labor—Forging		Stores, 6 per cent material	.60
		Labor—Forging	
		Blacksmith, 2¼ hr. at .87	1.96
		Heater, 2¼ hr. at .77	1.73
		Helper, 9 hr. at .57	5.13
		Overhead, 50 per cent labor	4.41
Total	$10.02	Total	$23.86
Shape-Cutting Machine			
Nozzle No. 4—Pressure 50 lb.			
84 Linear in.—5-in. Stock			
Labor—			
Set, ⅛ hr. at 1.34	$ .22		
Cutting, 17/60 hr. at 1.34	.38		
Overhead, 50 per cent labor	.30		
Oxygen, 107.2 cu. ft.	1.45		
Acetylene, 9.86 cu. ft.	.24		
Stores, 6 per cent material	.10		
Total	$ 2.69		
Machine Shop		**Machine Shop**	
Labor—Finishing		Labor—Finishing	
Slot, 6 hr. at .77	$ 4.62	Slot, 16⅔ hr. at .77	$12.83
Overhead, 50 per cent labor	2.31	Overhead, 50 per cent labor	6.42
Total	$ 6.93	Total	$19.25
Total gross cost	$19.64	Total gross cost	$43.11
Scrap Allowance		**Scrap Allowance**	
180 lb. at .0057	$ 1.03	180 lb. at .0044	$ .79
Total net cost	$18.61	Total net cost	$42.32
			18.61
		Total saving effected	$23.71

Table II—Comparative Manufacturing Costs—One Front-frame Section, Profile Forged

Shape-Cutting Method— Smith Shop		Previous Method— Smith Shop	
Material, 950 lb. at .021	$19.95	Material, 950 lb. at .021	$19.95
Fuel, 570 lb. at .001765	1.01	Fuel, 760 lb. at .001765	1.34
Stores, 6 per cent material	1.26	Stores, 6 per cent material	1.28
Labor—Forging		Labor—Forging	
Blacksmith, 3⅓ hr. at .87	2.90	Blacksmith, 5 hr. at .87	4.35
Heater, 3⅓ hr. at .77	2.57	Heater, 5 hr. at .77	3.85
Helper, 13⅓ hr. at .57	7.60	Helper, 20 hr. at .57	11.40
Overhead, 50 per cent labor	6.54	Overhead, 50 per cent labor	9.80
Total	$41.83	Total	$51.97
Shape-Cutting Machine			
Nozzle No. 4—Pressure 45 lb.			
97 Linear in.—4½-in. Stock			
Labor—			
Set, 1 13/60 hr. at 1.34	$ 1.63		
Cutting, 17/60 hr. at 1.34	.38		
Overhead, 50 per cent labor	1.00		
Oxygen, 99 cu. ft.	1.33		
Acetylene, 8 cu. ft.	.19		
Stores, 6 per cent material	.09		
Total	$ 4.62		
Machine Shop		**Machine Shop**	
Labor—Finishing		Labor—Finishing	
Plane, 8 hr. at .77	$ 6.16	Slot, 15 hr. at .77	$11.55
Slot, 6 hr. at .77	4.62	Plane, 5 hr. at .77	3.85
Overhead, 50 per cent labor	5.39	Overhead, 50 per cent labor	7.70
Total	$16.17	Total	$23.10
Total gross cost	$62.62	Total gross cost	$75.07
Scrap Allowance		**Scrap Allowance**	
305 lb. at .0083	$ 2.53	500 lb. at .00516	$ 2.58
195 lb. at .00516	1.01		
Total net cost	$59.08	Total net cost	$72.49
			59.08
		Total saving effected	$15.41

Table II also shows the comparative manufacturing costs of a front-frame section which was, in this case, profile forged and, consequently, resulted in a smith-shop charge for both methods of manufacture, with a $10 saving in favor of the shape-cutting method. The cost of the shape-cutting operation was $4.62 and $12.35 was saved in the subsequent machining operation, leav-

Unusually heavy alloy-steel front-frame section cut directly from a 7,200-lb. billet on the shape-cutting machine

ing a total saving, after deducting the scrap allowances. of $13.41. The fact that this front-frame section weighed 950 lb., as compared to 450 lb. in the case of the front-frame section cut from a billet renders the greater saving in that case particularly impressive.

A detailed examination of the table of main-rod holes cut on the shape-cutting machine, a total of 221 linear inches of 5 in. stock being cut. With suitable labor charges for one operator and one helper, material charges for 557 cu. ft. of oxygen and 51 cu. ft. of acetylene and suitable charges for stores expense and overhead, the shape-cutting operation cost $13.44. Subsequent machining of the main rods all over, necessitated in the interests of removing all surface imperfections, cost $55.15. Deducting a scrap allowance, the total net cost of making two main rods by this method was $303.79. Referring to the right column, the detailed costs of manufacture by the previous method are indicated, a substantially more extensive forging operation being acquired at a cost of $317.78, or, roughly, $62 more than when the shape-cutting machine is used. Similarly, by the previous method of manufacture, substantially manufacturing costs, shown in Table III, will be of special interest because of the large savings effected, which aggregated $130.84 per pair of rods in favor of the shape-cutting method. Referring to the tabulation at the left in Table III, the first operation consisted of forging the rods from billets with the heads left blank for profiling with the shape-cutting machine. The smith-shop costs, including complete charges for material, fuel, labor and generous charges for stores and overhead expense, total $255.52. Using a No. 4 nozzle at a pressure of 50 lb., the main-rod heads were profiled and pin

Table III—Comparative Manufacturing Costs—Two Main Rods, Heads Profiled

Shape-Cutting Method— Smith Shop		Previous Method— Smith Shop	
Material, 6110 lb. at .02	$122.20	Material, 6110 lb. at .02	$122.20
Fuel, 3666 lb. at .001715	6.30	Fuel, 4888 lb. at .001715	8.39
Stores, 6 per cent material	7.71	Stores, 6 per cent material	7.84
Labor—Forging		Labor—Forging	
Blacksmith, 20⅓ hr. at .87	17.69	Blacksmith, 30½ hr. at .87	26.54
Heater, 20⅓ hr. at .77	15.46	Heater, 30½ hr. at .77	23.49
Helper, 81⅓ hr. at .57	46.39	Helper, 122 hr. at .57	69.54
Overhead, 50 per cent labor	39.77	Overhead, 50 per cent labor	59.78
Total	$255.52	Total	$317.78
Shape-Cutting Machine			
Nozzle No. 4—Pressure 50 lb. 221 Linear in.—5-in. Stock			
Labor—			
Set, ⅔ hr. at 1.34	$ .89		
Cutting, 1 7/15 hr. at 1.34	1.96		
Overhead, 50 per cent labor	1.43		
Oxygen, 557 cu. ft.	7.39		
Acetylene, 51 cu. ft.	1.25		
Stores, 6 per cent material	.52		
Total	$ 13.44		
Machine Shop		Machine Shop	
Labor—Finishing		Labor—Finishing	
Bore, 16½ hr. at .77	$ 12.70	Drill & bore, 59 hr. at .77	$45.43
Slot, 11½ hr. at .77	8.85	Mill, 43 hr. at .77	33.11
Mill, 19 23/30 hr. at .77	15.22	Slot, 14⅔ hr. at .77	11.29
Overhead, 50 per cent labor	18.38	Overhead, 50 per cent labor	44.92
Total	$ 55.15	Total	$134.75
Total gross cost	$324.11	Total gross cost	$452.53
Scrap Allowance		Scrap Allowance	
1734 lb. at .0061	$ 10.58	3808 lb. at .0047	$ 17.90
2074 lb. at .0047	9.74		
Total net cost	$303.79	Total net cost	$434.63
			303.79
		Total saving effected	$130.84

Table IV—Comparative Manufacturing Costs—Six Eccentric Rods, Profile Forged

Shape-Cutting Method— Smith Shop		Previous Method— Smith Shop	
Material, 1788 lb. at .021	$37.55	Material, 1788 lb. at .021	$37.55
Fuel, 1073 lb. at .001604	1.72	Fuel, 1430 lb. at .001604	2.29
Stores, 6 per cent material	2.36	Stores, 6 per cent material	2.39
Labor—Forging		Labor—Forging	
Blacksmith, 6 hr. at .87	5.22	Blacksmith, 9 hr. at .87	7.83
Heater, 6 hr. at .77	4.62	Heater, 9 hr. at .77	6.93
Helper, 24 hr. at .57	13.68	Helper, 36 hr. at .57	20.52
Overhead, 50 per cent labor	11.76	Overhead, 50 per cent labor	17.64
Total	$76.91	Total	$95.15
Shape-Cutting Machine			
Nozzle No. 4—Pressure 55 lb. 129 Linear in.—3-in., 4-in., 6½-in. Stock			
Labor—			
Set, 1 hr. at 1.34	$1.34		
Cutting, 2 3/10 hr. at 1.34	3.08		
Overhead, 50 per cent labor	2.21		
Oxygen, 836.4 cu. ft.	11.29		
Acetylene, 78.42 cu. ft.	1.92		
Stores, 6 per cent material	.79		
Total	$20.63		
Machine Shop		Machine Shop	
Labor—Finishing		Labor—Finishing	
Slot, 5¼ hr. at .77	$ 4.04	Drill, 4½ hr. at .77	$ 3.46
Mill, 27½ hr. at .77	21.17	Slot, 8 hr. at .77	6.16
Plane, 12 hr. at .77	9.24	Mill, 45¾ hr. at .77	35.11
Overhead, 50 per cent labor	17.23	Plane, 14½ hr. at .77	11.16
		Overhead, 50 per cent labor	27.95
Total	$ 51.68	Total	$ 83.84
Total gross cost	$149.22	Total gross cost	$178.99
Scrap Allowance		Scrap Allowance	
528 lb. at .0057	$ 3.01	1206 lb. at .0044	$ 5.31
678 lb. at .0044	2.98		
Total net cost	$143.23	Total net cost	$173.68
			143.23
		Total saving effected	$ 30.45

Miscellaneous templates used in manufacturing locomotive and car parts on automatic oxyacetylene shape-cutting machine

more subsequent machine work was required on the roads at a cost almost $80 more than when the shape-cutting machine was used. The large savings in both smith-shop and machine work account for the total saving mentioned of $130.84 per pair of rods.

Table V—Comparative Manufacturing Costs—Two Spring-Equalizer Beams, Cut from Billet

Shape-Cutting Method—		Previous Method—	
Smith Shop		**Smith Shop**	
Material, 316 lb. at .021	$ 6.64	Material, 316 lb. at .021	$ 6.64
Fuel, ... lb. at.	—	Fuel, 240 lb. at .00164	.39
Stores, 6 per cent material	.40	Stores, 6 per cent material	.42
Labor—Forging		Labor—Forging	
		Blacksmith, 2 hr. at .91	1.82
		Heater, 2 hr. at .81	1.62
		Helper, 8 hr. at .61	4.88
		Overhead, 50 per cent labor	4.16
Total	$ 7.04	Total	$19.93
Shape-Cutting Machine			
Nozzle No. 4—Pressure 45 lb.			
89 Linear in.—4½-in. Stock			
Labor—			
Set, .50 hr. at 1.42	$ .71		
Cutting, .50 hr. at 1.42	.71		
Overhead, 50 per cent labor	.71		
Oxygen, 175.0 cu. ft.	2.36		
Acetylene, 15.5 cu. ft.	.40		
Stores, 6 per cent material	.17		
Total	$ 5.06		
Machine Shop		**Machine Shop**	
Labor—Finishing		Labor—Finishing	
Total gross cost	$12.10	Total gross cost	$19.93
Scrap Allowance		**Scrap Allowance**	
162 lb. at .00743	$ 1.20	162 lb. at .00506	$ .82
Total net cost	$10.90	Total net cost	$19.11
			10.90
		Total saving effected	$ 8.21

As in the case of main rods, the comparative costs of manufacturing six eccentric rods, shown in Table IV, indicate an important saving in favor of the shape-cutting method. As these rods cannot be cut direct from billets, but must be profile forged, a forging operation is required with both the shape-cutting method and the previous method, the amount of forging work and, consequently, its cost, however, being approximately $18 less in the former case. The cost of the shape-cutting operation is given as $20.63 and the machine shop cost as $51.68, or, roughly, $32 less than when the rods are machined all over direct from the forging. The total saving effected in the manufacture of these six eccentric rods by the shape-cutting method is given as $30.45.

In the case of the two spring-equalizer beams, cut from a billet, as shown in Table V, no preliminary forging is required with the shape-cutting method nor is any subsequent machining necessary. The total gross cost is, therefore, given as $12.10, which may be compared with $19.93 by the previous forging method, or, deducting the necessary allowances for scrap, a total saving of $8.21.

In Table VI, the comparative costs of manufacturing four guide yokes are shown. About $73 is saved in the preliminary profile-forging operation over the cost of forging by the previous method. The cost of the shape-cutting operation, which involved 40 linear inches of 8 in. stock and 32 linear inches of 12 in. stock totaled $18.52. Subsequent machine work on the guide yokes was only $167.48 or almost $67 less than by the former method, leaving a total saving, after deduction of the proper scrap allowances, of $128.52.

These specific illustrations of the economical use of oxyacetylene shape-cutting equipment in railway shops might be continued indefinitely, but it is believed that enough have been cited to stimulate renewed interest in this particular type of equipment.

Table VI—Comparative Manufacturing Costs—Four Guide Yokes, Profile Forged

Shape-Cutting Method—		Previous Method—	
Smith Shop		**Smith Shop**	
Material, 7120 lb. at .021	$149.52	Material, 7120 lb. at .021	$149.52
Fuel, 4272 lb. at .00179	7.64	Fuel, 5696 lb. at .00179	10.19
Stores, 6 per cent material	9.42	Stores, 6 per cent material	9.58
Labor—Forging		Labor—Forging	
Blacksmith, 24 hr. at .87	20.88	Blacksmith, 36 hr. at .87	31.32
Heater, 24 hr. at .77	18.48	Heater, 36 hr. at .77	27.72
Helper, 96 hr. at .57	54.72	Helper, 144 hr. at .57	82.08
Overhead, 50 per cent labor	47.04	Overhead, 50 per cent labor	70.56
Total	$307.70	Total	$380.97
Shape-Cutting Machine			
Nozzle No. 4—Pressure 60 lb., 90 lb.			
40 Linear in., 8 in. Stock			
32 Linear in., 12 in. Stock			
Labor—			
Set, 2 hr. at 1.34	$ 2.68		
Cutting, 1½ hr. at 1.34	1.79		
Overhead, 50 per cent labor	2.24		
Oxygen, 716 cu. ft.	9.67		
Acetylene, 60 cu. ft.	1.47		
Stores, 6 per cent material	.67		
Total	$ 18.52		
Machine Shop		**Machine Shop**	
Labor—Finishing		Labor—Finishing	
Mill sides, 75 hr. at .77	$ 57.75	Mill sides, 87 hr. at .77	$ 66.99
Est. plane, 38 hr. at .77	29.26	Plane, 64 hr. at .77	49.28
Mill edges, 24 hr. at .77	18.48	Mill edges, 40 hr. at .77	30.80
Slot, 8 hr. at .77	6.16	Slot, 12 hr. at .77	9.24
Overhead, 50 per cent labor	55.83	Overhead, 50 per cent labor	78.15
Total	$167.48	Total	$234.46
Total gross cost	$493.70	Total gross cost	$615.43
Scrap Allowance		**Scrap Allowance**	
2400 lb. at .0083	$ 19.92	4480 lbs. at .00547	$ 24.50
2080 lb. at .00547	11.37		
Total net cost	$462.41	Total net cost	$590.93
			462.41
		Total saving effected	$128.52

Whitening the Edges of Footboards on Switchers

A NUMBER of railroads have adopted the practice of painting the edges of front and back footboards on switching locomotives with white paint in order to cut down injuries to men whose duty demands that they ride on these steps while switching trains or cars.

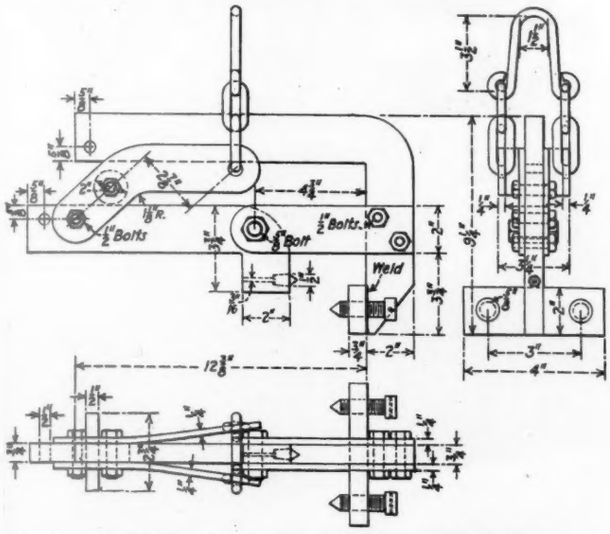
Painting the footboards white makes it easy to see them

One coat of paint applied to the edges of the steps once each week will keep them sufficiently bright to attract attention and will prevent many injuries especially on night shifts or during foggy or rainy weather.

Do They Take Old Razor Blades?—The problem of what to do with antique railroad equipment has been solved by the Chicago & North Western, which presented a collection of obsolete railroad material to the Museum of Science and Industry in Chicago.

Two Lifting Hooks For the Back Shop

THE problem of handling material around a shop and providing suitable equipment for doing the job requires considerable ingenuity. Two hooks are shown in the drawings, one of which is designed for lifting shoes, wedges and crosshead slippers when still

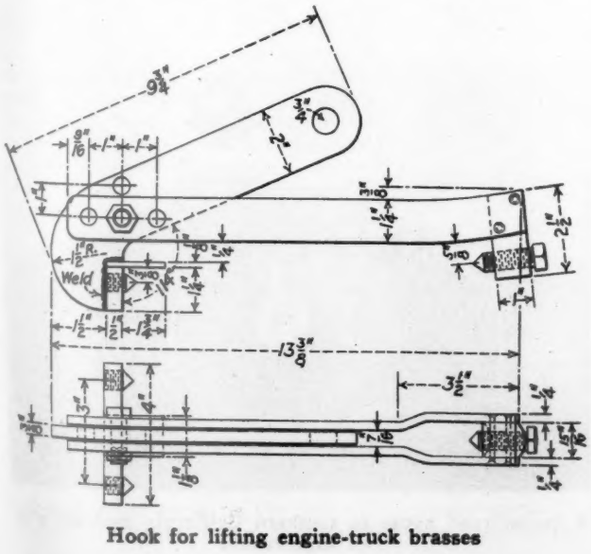


Device for lifting shoes, wedges and crosshead slippers—Used on rough castings

rough castings, and the other is used for handling engine-truck brasses. Both hooks are of simple construction and can be made in the smith and machine shops.

Shoes, wedges, or crosshead slippers are clamped between the two ⅝-in. screws and ½-in. pointed dowel when the lifting chain is pulled taut. The screws, which are inserted through a ¾-in. by 2-in. by 4-in. crosspiece welded to the long clamp arm, are placed 3 in. apart and can be adjusted to suit. The hook or chain fastening is in the shape of an inverted U and is secured to the two lift arms. These arms are pivoted to the short clamp arm by a ½-in. bolt.

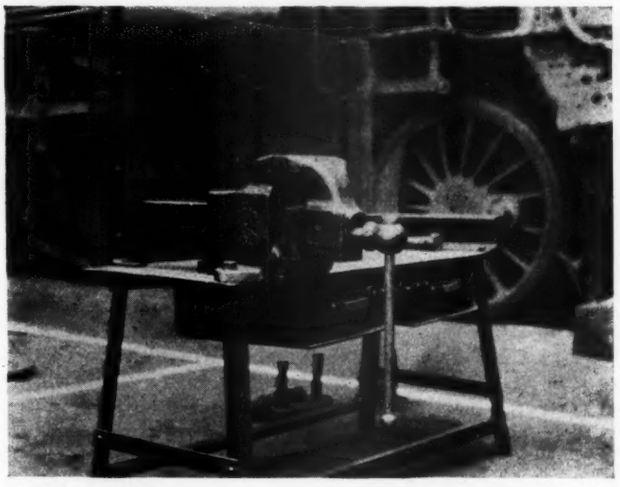
The hook for lifting engine-truck brasses is of somewhat similar design with respect to method of operation. Raising the lift arm clamps the brass between the three contact points. A ½-in. by 1¼-in. by 4-in. crosspiece welded to the inside shoulder of the lift arm is provided with two contact points which are made from ⅝-in. bolts screwed into tapped holes as shown. A ⅝-in. clamp screw at the opposite end of the device provides for necessary adjustment.



Hook for lifting engine-truck brasses

Screen Shields For Bench Vises

A PIECE of front-end netting attached to the side or end of the work bench in the shop will prove a valuable aid in preventing injuries to employees as a result of chips or flying particles from the vise striking



A chipping shield will prevent injuries to nearby workmen

them while they are either engaged at some job in the vicinity of the bench or are merely walking past it.

Where a great amount of chipping is done, such as cutting bolts or rivets out of pipe clamps or removing nuts from defective bolts and rods it is advisable to provide a shield on the end and on one side of the bench.

The employees using the vise should be instructed to chip toward this shield, otherwise it is useless.

Air-Operated Snow Flanger

*By E. Sears**

OWING to the accumulation of snow on the track during the winter months, especially in the mountainous section of the Chicago, Milwaukee, St. Paul & Pacific, it is necessary to run a flanger at intervals to clear the snow out between the rails.

A special flanger was built and applied on electric locomotive No. 10209. Fig. 1 shows a window midway along the cab built out so the operator of the flanger can see in either direction and can raise the flanger to avoid any of the interferences that are located along the track, such as crossings, etc. This flanger is between the two units and can be seen just below the extension window. Inasmuch as these locomotives are

* Mr. Sears is division master mechanic of the Chicago, Milwaukee, St. Paul & Pacific at Deer Lodge, Mont.

not turned on a turntable at the outlying points, the flanger is built so it will flange in either direction.

Fig. 2 shows a side view of the flanger. It is built in the form of a plow and is double-pointed to plow in either direction. Spring-steel strips are used at the bottom of the flanger to clear the snow out below the rail for a depth of 3 in. The outside wing, which is shown in Figs. 2 and 3, is self-adjusting so as to throw the snow in either direction and adjust itself to either mold board.

The flanger is operated by an air valve which is lo-

Fig. 1—Electric locomotive equipped for snow flanging

cated near the extension window shown on the side of the cab at the back of the *B* unit, Fig. 1. It is operated by an air cylinder, the piston rod of which presses down on the wishbone levers, as shown in Fig. 3. The cylinder is in a vertical position and the operating levers for raising and lowering the plow are pivoted to the frames. The plow is locked in the raised position by a dog on either side of the vertical pistons, which are locked in place by pins. When the flanger is to be operated, air is admitted to the cylinder which lifts the plow up so that it can be unlocked. The weight of the plow lowers it and forces the air from the cylinder

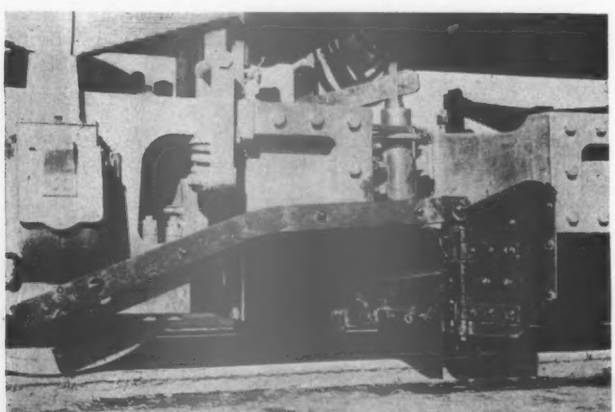


Fig. 2—The flanger is double pointed and plows in either direction

so that there is no pressure under the piston when the plow is operating as a flanger. The only time air is used is when it is desired to raise the flanger for obstructions between the rails, or to raise and lock it permanently for transportation. This flanger is built to standard clearances so that there is nothing to be removed when the flanger is not in use.

The advantage of having a flanger of this kind is

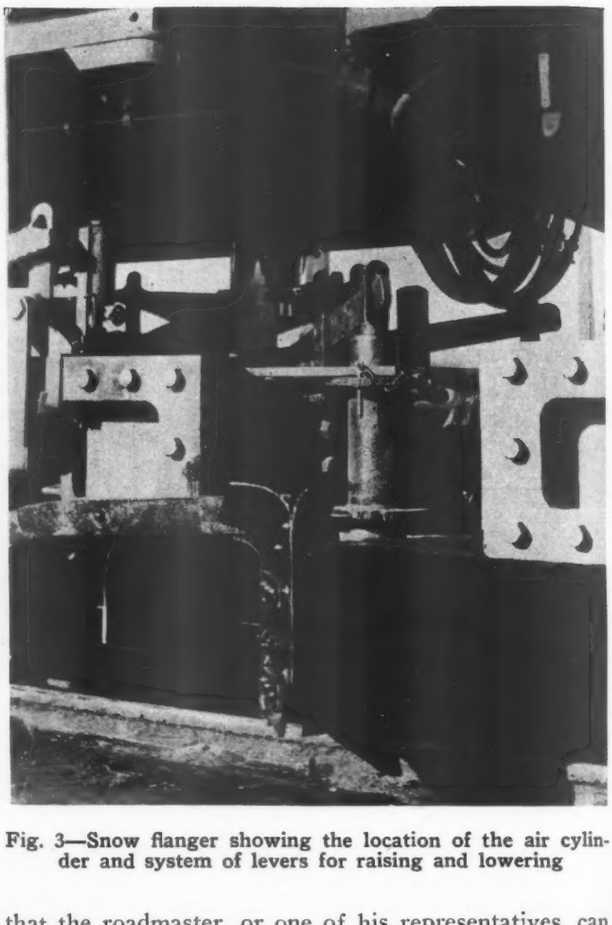


Fig. 3—Snow flanger showing the location of the air cylinder and system of levers for raising and lowering

that the roadmaster, or one of his representatives, can go out with the locomotive when it is in regular freight service and do the flanging while the locomotive is handling a train, so there is no cost for extra train handling.

Fig. 2 shows the guides for the vertical pistons which are 6 in. in diameter. These are bolted to the face of the truck frame. A long brace from the binder to the plow is included, which can either push or pull to take part of the strain off the vertical pistons. Fig. 3 shows the location of the two pistons, one on either side of the end frame.

* * *

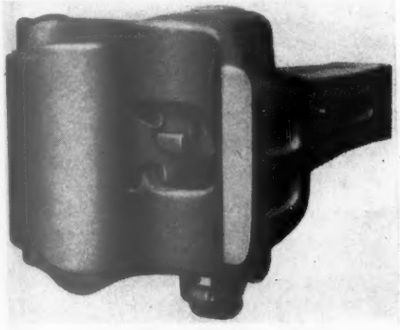
A quaint road house in southern California modeled after an enginehouse

NEW DEVICES

A.R.A. Type "E" Coupler

The culmination of 14 years of joint study of the type "D" coupler by the A.R.A. Coupler Committee and the coupler manufacturers is the recent announcement of the new A.R.A. type "E" coupler which is being manufactured by the American Steel Foundries, Chicago; Buckeye Steel Castings Company, Columbus, Ohio; Gould Coupler Company, New York; McConway & Torley Company, Pittsburgh, Pa.; and National Malleable & Steel Castings Company, Cleveland, Ohio. The type "E" coupler is so designed that it may be furnished for rotary or top operation. In the rotary operated type "E" coupler the knuckle is unlocked and opened easily and positively by the use of the operating rod only and its anti-creep feature is positive. These features of coupler service make the rotary operated coupler the preferred form for general use. The same coupler can be fitted by a change of actuating parts only for either type of operation.

The improvements and advantages claimed for the new type "E" coupler



A.R.A. Type E coupler

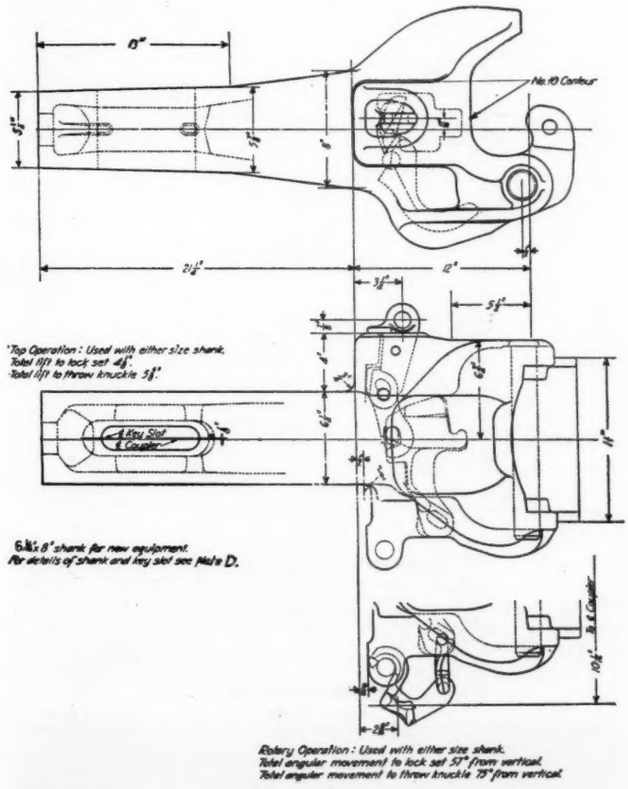
are: Increased strength of knuckle-side wall of the coupler; reinforcement of the front face of the coupler; improved operation; improved lock-to-the-lock; improved top lock lifter; the impossibility of the top lock lifter becoming wedged beneath the anti-creep lug; increased strength of the lock leg and improved support for the lock; prevention of vertical slipover and increased strength of shank.

In the type "E" coupler the top and bottom walls of the head, where they join the side wall above and below the knuckle tail, have been brought closer together and have been joined to the side wall by large fillets. These walls, therefore, surround the knuckle tail more closely with the result that the buffing blows from the knuckle tail are distributed over a larger area and the bending stresses set up in the side wall are greatly decreased. In addition to this, the side wall thickness has been increased ⅛ in.

In providing reinforcements for the front face of the coupler, four changes have been made: (1) The guard arm has been redesigned to be stronger in keeping with the greater strength of the new shank; (2) the front face thickness has been increased and a more uniform distribution of metal has been secured; (3) the notch provided in the type "D" coupler through the upper front face for the insertion of the lock has been eliminated; (4) the new shank locates the key slot ⅛ in. higher than the present one thus preventing some of the drooping of the coupler head which had much to do with the breakage of the upper face.

In the type "E" coupler the effective length of the knuckle thrower arm from the center of the thrower pivot to the point of contact between the lock leg and thrower has been increased from 2.5 to 4 in. This increase in knuckle thrower leverage applies to both rotary and top operated couplers. A further improvement in the top operated form has been brought about by the attachment of the top lock lifter to the lock at a lower point on the lock and slightly farther back from the fulcrum. A comparison of the operating efficiency of the types "E" and "D" couplers is shown in the following table—the figures in which are the result of actual tests and represent the force required at the end of a 12-in. operating rod handle to operate the couplers:

In the rotary operated type "E" coupler, the lock-to-the-lock is made positive by restricting the rearward movement of the lock leg in the lock hole of the coupler, thus insuring positive engagement of that portion of the toggle which underlies the anti-creep lug. In the top operated form a two-part lifter has been provided, the two parts being pivoted together for a limited movement relative to each other. The lower member which is hooked into the lock lies normally beneath the anti-creep ledge in the coupler head and is positively locked beneath this ledge when the top member is in its normal lowermost position. In lifting the lock, the first movement unlocks the lower member and then moves it out from beneath



Type E coupler with a 6¼-in. by 8-in. shank for new equipment

Coupler	Operation	Lb. Pull to Operate: To Lockset Min.	To Lockset Max.	To Lockset Ave.	To Open Knuckle Min.	To Open Knuckle Max.	To Open Knuckle Ave.
Type "D"	Imperial type "B", top operation	26	36	30.8	77	118	98.0
Type "E"	Imperial type "B", top operation	29	36	32.4	53	68	58.9
Type "D"	Bottom operation—standard	21	36	29.4	67	95	81.2
Type "E"	Bottom operation—rotary	11	17	13.5	24	37	29.4

the ledge. The unlocking action in both rotary and top operated forms is positive even when the coupler is in extreme buffed or pulled out position.

The new two-part top lock lifter with the flexible connection between the parts is designed to eliminate the bending and breakage which were occasionally found in the rigid one-piece lifter.

The anti-creep lug in the type "E" coupler is above the lock instead of to the rear. The lifter is pivoted to the lock by a partly closed hook and has no sliding action in the slot of the lock. These features eliminate the possibility of lock-lifters becoming wedged beneath the anti-creep lug.

The type "E" lock has a ledge extending over the knuckle tail, and the knuckle tail has a shelf extending beneath the body of the lock. These supports for the lock lie close to the center of gravity of the lock. Part of the weight of the lock is also carried on the knuckle thrower with the result that the two supports extending toward the front of the lock and a third support on the knuckle thrower at the rear of the lock hold it in a stable, upright position. Thus, any hammering contact of the lock leg against the front and rear walls of the lock hole in the bar is prevented. These supports for the lock also keep the upper part of the lock normally out of contact with the inner front wall and thus prevent wear at this point. In addition, the lock leg has been made considerably wider and stronger, its cross-sectional area having been increased approximately 28 per cent.

The minimum depth of the pulling face of type "E" knuckles has been increased from 9 in. to 11 in. to overcome the vertical slipover of knuckles where maximum variation in heights of cars is present combined with vertical irregularities in track.

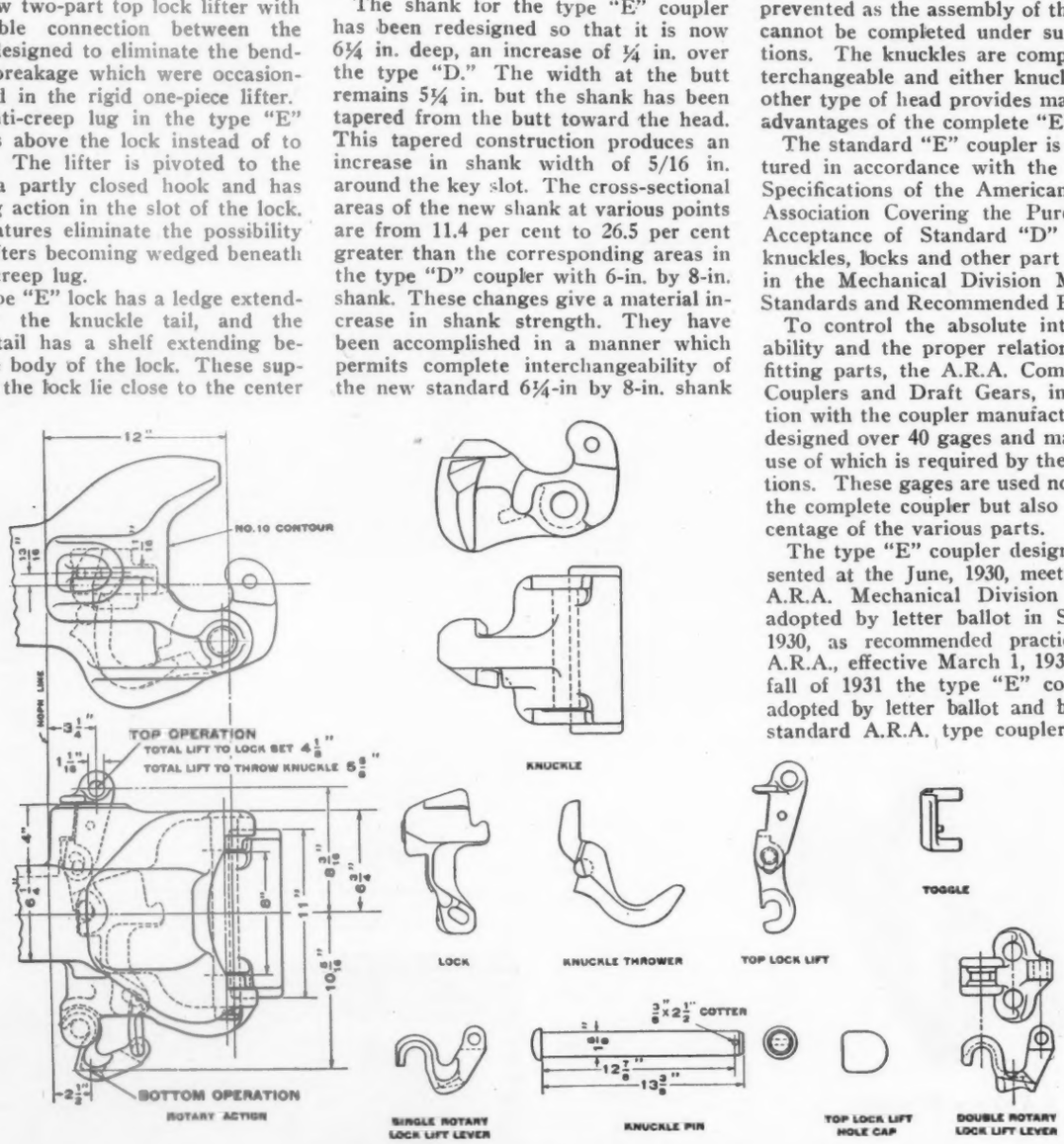
The shank for the type "E" coupler has been redesigned so that it is now 6¼ in. deep, an increase of ¼ in. over the type "D." The width at the butt remains 5¼ in. but the shank has been tapered from the butt toward the head. This tapered construction produces an increase in shank width of 5/16 in. around the key slot. The cross-sectional areas of the new shank at various points are from 11.4 per cent to 26.5 per cent greater than the corresponding areas in the type "D" coupler with 6-in. by 8-in. shank. These changes give a material increase in shank strength. They have been accomplished in a manner which permits complete interchangeability of the new standard 6¼-in by 8-in. shank with the former standard 6-in. by 8-in. shank and it has been recommended that the 6¼-in. by 8-in. shank be used in all equipment which has heretofore utilized 6-in. by 8-in. shanks.

The type "E" coupler, while differing in many respects from the type "D", has been designed to permit interchangeability of many parts. The new knuckle and knuckle pin may be used in the type "D" heads and when so used will provide a support for the "D" lock similar to that in the type "E" coupler. Also, "D" knuckles can be used in "E" heads and the "E" locks will be supported by the "D" knuckle. The "E" locks and knuckle throwers cannot be used in "D" couplers nor can "D" locks and throwers be assembled in "E" heads. The rotary operating parts of "D" and "E" couplers are not interchangeable and it is impossible to assemble either type of parts in the other type of head. Thus, the assembly of any non-interchangeable part in the wrong type of head is positively prevented as the assembly of the coupler cannot be completed under such conditions. The knuckles are completely interchangeable and either knuckle in the other type of head provides many of the advantages of the complete "E" coupler.

The standard "E" coupler is manufactured in accordance with the Standard Specifications of the American Railway Association Covering the Purchase and Acceptance of Standard "D" couplers, knuckles, locks and other part as shown in the Mechanical Division Manual of Standards and Recommended Practice.

To control the absolute interchangeability and the proper relation between fitting parts, the A.R.A. Committee on Couplers and Draft Gears, in conjunction with the coupler manufacturers, has designed over 40 gages and masters, the use of which is required by the specifications. These gages are used not only for the complete coupler but also for a percentage of the various parts.

The type "E" coupler design was presented at the June, 1930, meeting of the A.R.A. Mechanical Division and was adopted by letter ballot in September, 1930, as recommended practice of the A.R.A., effective March 1, 1931. In the fall of 1931 the type "E" coupler was adopted by letter ballot and became the standard A.R.A. type coupler, effective March 1, 1932. An abstract of the original report, together with detailed drawings of the type "E" coupler were published in the Railway Age Daily for June 21, 1930, page 1548-D-26.



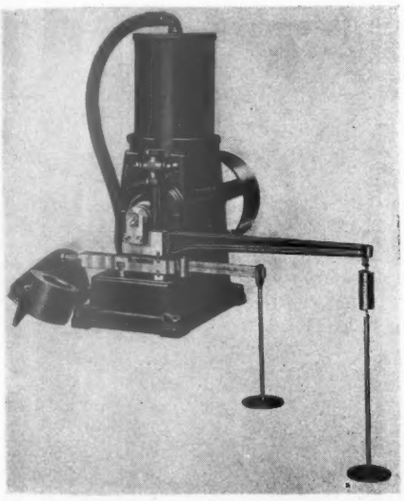
Details of Type E coupler and knuckle parts

Timken Wear and Lubricant Tester

The Timken Roller Bearing Company, Canton, Ohio, has recently developed a testing device designed to test the load carrying capacity of the film strength of lubricants, particularly beyond the range of viscous lubrication and is, therefore, desirable for testing "extreme pressure" lubricants. Both fluid oils and greases can be tested. The Timken lubricant tester was originally developed in the Laboratories of The Timken Roller Bear-

ing Company during a series of tests on the effect of different lubricants on Hypoid and spiral bevel gears in automotive axles. The machine is compact in design, the overall base dimensions are 8½ in. wide by 13½ in. long and 22 in. high. The two lever arms add to the overall length, one being 7½ in. long and the other being 15 in. The weight of the machine installed is 135 lb. The base is of cast iron provided with 7/16 in. bolt holes.

The lubricant container, or tank, is mounted on top of the base and is calculated to hold about one gallon of lubricant. Directly under it is an electric plate heater which will raise and hold the contents of the container to any desired temperature from ambient to 210 deg. F. In operation, oil from the container flows over the test piece to a sump in the base, the rate of flow being adjustable by means of a valve in the pipe line.



The Timken wear and lubricant testing machine

The oil is pumped back from the sump by means of a small pump located in the base and driven from the testing mandrel. The latter extends longitudinally through the base and may be either direct or belt driven by a two hp. synchronous speed electric motor. The mandrel is mounted in Timken bearings so arranged as to hold it rigidly in alinement and is tapered at the end opposite the pulley to receive the tapered test piece or cup. The latter is held firmly in place by a circular nut (with left hand thread) which screws onto the mandrel.

The lever system, which is the most important part of the device, consists of two levers, one above the other. The upper is known as the load lever and the lower as the friction lever. The upper, which carries the test block, is pivoted on a knife-edge mounted in the lower lever, and the latter is also pivoted on a knife edge and provided with a stop at the unloaded end. The friction lever is provided with a vernier scale and a sliding weight for obtaining accurate measurements and both levels are supplied with weight hangers. By virtue of this arrangement the test block is always in the same relative position to the revolving cup and the unit loading over the length or surface is always constant. The test block is inserted in a notch in the adaptor and held firmly in place by a wedge. For testing lubricants the test pieces ordinarily consist of a Timken cup, of a size that will fit closely on the mandrel, and the block which is a small piece of steel about ½ in. square by ¾ in. long. Both test pieces are made of carburized steel hardened to 60

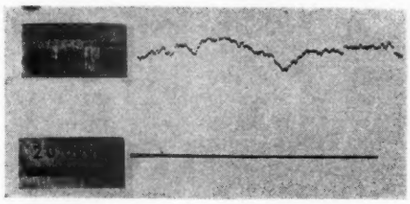


Illustration of the record for scored and perfect surfaces

C Rockwell and ground. Four test pieces can be run with one test block but each new face tested requires a new cup on the mandrel or else that the cup be reground.

The operation of the Timken lubricant tester provides a record of permanent character. It is a simple matter to etch the used test blocks with the amount of load and type of lubricant they were used with. The amount and character of the scuffing on the blocks can be analyzed at leisure and this information filed together with the rest of the data.

High-Speed Freight-Car Trucks

As a practical solution of the newly developed need for smooth-riding freight-car trucks at modern high operating speeds, the American Steel Foundries has developed, during the past twelve months, the Simplex high-speed railway truck for new equipment, and the Type C bolster and series spring arrangement for application to existing trucks. Since October, 1931, comprehensive and accurate road tests of these improved truck designs, in comparison with cars equipped with ordinary helical-spring trucks, have been conducted on the Chicago & North Western.

The tests show that the conventional helical-spring truck has generally satisfactory riding qualities at some speeds, but that at certain critical speeds vertical oscillations build up destructive forces acting on the car parts and lading equivalent to an increase of 120 per cent or more of their dead weight. Cars equipped with either of the improved trucks, on the other hand, show easy riding qualities and freedom from violent vertical oscillations at all speeds, the maximum shocks rarely developing forces exceeding an increase of 30 per cent of the dead weight.

The Simplex high-speed railway truck, by a simple construction, utilizes a spring combination in which the high capacity of coil springs is used to carry a major portion of the load, and leaf springs are used for their desirable quality of friction absorption but are required to carry only a minor portion of the total load. This shock-absorbing principle of spring arrangement, as shown in the diagram, is designed to provide soft cushioning action and proper capacity for light and heavy loads, with complete freedom from undesirable oscillation.

In general appearance, the truck closely resembles an equalized four-wheel passenger truck. Its essential parts are side frames, leaf springs, coil springs and truck bolsters, no spring plank being required. When assembled, the coil springs fit over high bosses on the side frame. The leaf spring is supported at its ends in pockets in the side frame near the journal boxes and under the light weight of the car comes into contact with the coils and compresses them. The bolster holds the truck square and properly alined by jaws which fit over the top and sides of the leaf spring on each side of the band. Lugs on the under side of the bolster fit closely against the edges of the leaf spring band, which prevents longitudinal shifting of the bolster.

Referring to the diagram, the load *L* is carried at two distinct areas on the upper spring leaf. The major portion of the load *LL* is supported directly at *AA* by the coil springs. The minor portion of the load *LL* is supported at *BB* by the stiffness of the leaf spring.

The Type C truck with series spring suspension

All of the load *LL* is directly employed to press the surfaces of the plates together, thereby producing a maximum frictional absorption within the leaf spring. When coil springs alone are used, practically all of the energy of shocks is rebounded and a succession of such shocks often cause violent ver-

tical oscillations, and damage to the car body, its lading, trucks, wheels, and to the track structure. When leaf springs alone are used, the violent oscillations are prevented by friction between the spring leaves, but the comparatively large size and great weight of leaf spring required to equal the resiliency of the coil springs make their use impractical.

The tendency towards a decrease in frictional absorption frequency noted in ordinary leaf springs after they have been in service for a time, should not be noted in the leaf spring construction of the Simplex truck, in that the downward force of the bolster with the corresponding reaction upward of the coil springs keeps the leaves of the elliptic spring always pressed tightly together.

Wheel change is quickly and easily made by lifting the bolster until the jaws have cleared the leaf spring. After disconnecting the brake rigging, the side frame with springs in place is then free to be removed from the journals and the wheels removed and replaced.

The use of a long, well-designed leaf spring to act as the top member of the side frame, as well as to serve as a compound high-friction-absorption spring, allows the omission of the usual column guides, since the bolster is properly and securely retained in its place by the leaf-spring band. The elimination of the major frictional contacts between the column guides and bolster column fit makes unnecessary expensive column wearing-plate applications. The elimination of this contact between bolster and side frame also removes the possibility of binding when under extreme eccentric loading, and removes the danger of derailment due to such binding.

Should shimming be required, due to worn wheels or brasses, the Simplex truck is adapted for applying shims in a simple manner by raising the bolster and inserting shims of required thickness over the top leaf of the elliptic spring under the bolster jaws.

An increase of approximately three per cent in the total truck weight is represented, all of which is in additional weight of springs. In the case of the 40-ton capacity car, about 360 lb. of spring plank has been eliminated and about 800 pounds of additional springs utilized.

To determine the behavior of the Simplex high-speed truck under extreme conditions, severe impact, collision and intentional derailment tests were conducted. No indication of any harmful effect was reported after these tests.

The Type-C truck, also developed by The American Steel Foundries, embodies the series spring principle and truck bolster for use in converting old trucks. Old side frames, if serviceable, are retained, as are also old spring planks and some of the old coil springs. New bolsters and leaf springs are all that are needed.

In design, the Type C truck is materially different from the Simplex, but both make use of the fundamental spring suspension principle in railway trucks of using a leaf spring between either the coil and bolster or coil and side frame to soften the action transmitted by the coil. A spring plank rests upon the spring seat of the conventional side frame as at present, with leaf-spring seats mounted on it at the center of the side-frame spring seat. Two leaf springs rest on the spring plank, the inner ends engaging lugs on the bottom of the truck bolster and the outer ends carrying two coil springs. The coil springs support the end of the bolster, which is recessed to receive them.

By this spring construction, the coil springs serve in cushioning the load, but do not transmit any of their characteristic synchronous vertical oscillations since these are dampened by the leaf spring. The test results show that practically all that has been said relative to easy riding with the Simplex truck applies to the Type-C truck.

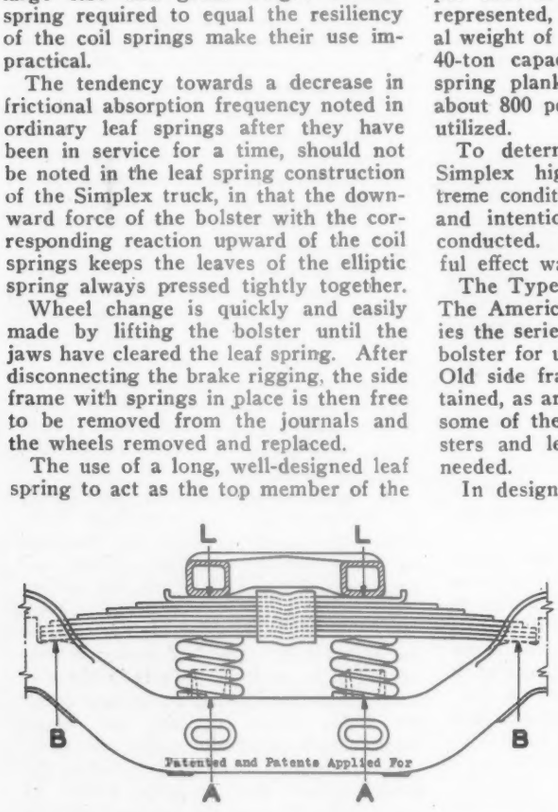
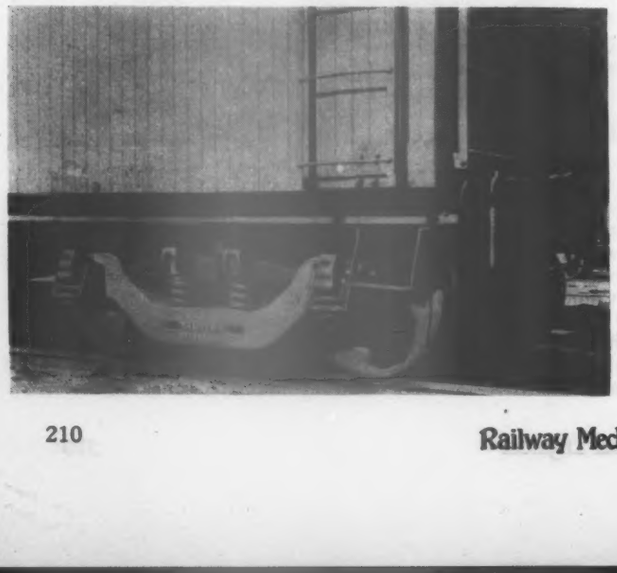


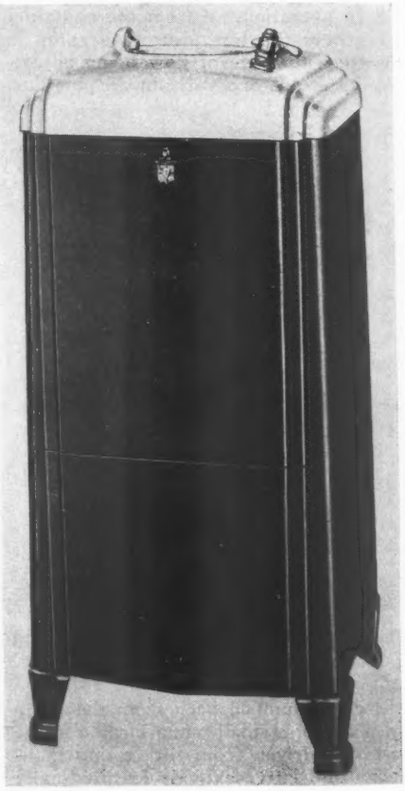
Diagram showing shock-absorption spring principle of the Simplex truck



The Simplex high-speed truck

Kelvinator Water Coolers

Kelvinator Corporation, Detroit, Mich., has recently announced several new types of water coolers adapted to use in shops and offices. The cabinets are of one-piece steel construction with removable lower front panel. The entire cabinet is spot welded and Bonderized, and painted inside and out. The outer finish consists of two coats of Flemish bronze lacquer. The tops are also of one-piece steel construction, finished to match the cabinet except in the case of the bubbler top types, one of which is shown in the illustration, which are made of vitreous china. On those models having refrigerant compartments, this compartment has a separate cooling coil insuring temperatures under 50 deg. The compartment is porcelain lined and has a drain in the center.



Kelvinator cooler with vitreous China bubbler top

The refrigerant is controlled by a high side float located in the machine compartment. The condensing unit is standard Kelvinator design of the high suc-

tion pressure type, designed particularly for operation with high side float control. The cooling units consist of silver plated water reservoirs of ¾-gal capacity. Cooling is achieved by means of sleeve-type designed evaporators in which the refrigerant completely surrounds the water to be cooled. The faucets are designed for one-hand operation and are chromium plated.

Alco Lateral Cushioning Device

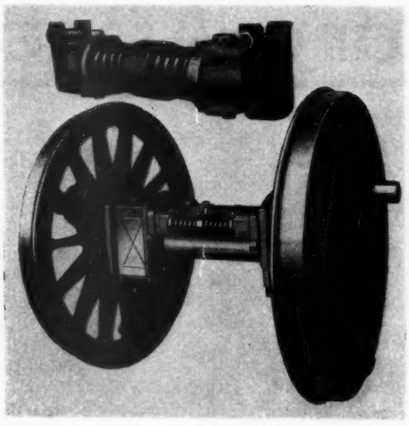
A lateral motion device has been developed and placed on the market by the American Locomotive Company, 30 Church street, New York. This device, which is known as the Alco lateral cushioning device, was designed to allow locomotives to pass through curves with a minimum of wear on the rail and flanges, wheel hubs and box faces, relieve lateral stresses in locomotive and track, and improve riding qualities.

This device is placed between the two driving boxes on each side of the axle and in line with the journal-bearing surfaces. Each unit consists of two end spring seats, which are keyed to the shaft by bolts, and two compression springs. These springs are separated by the shaft washer. The yokes are welded to the inside faces of the boxes and support the units.

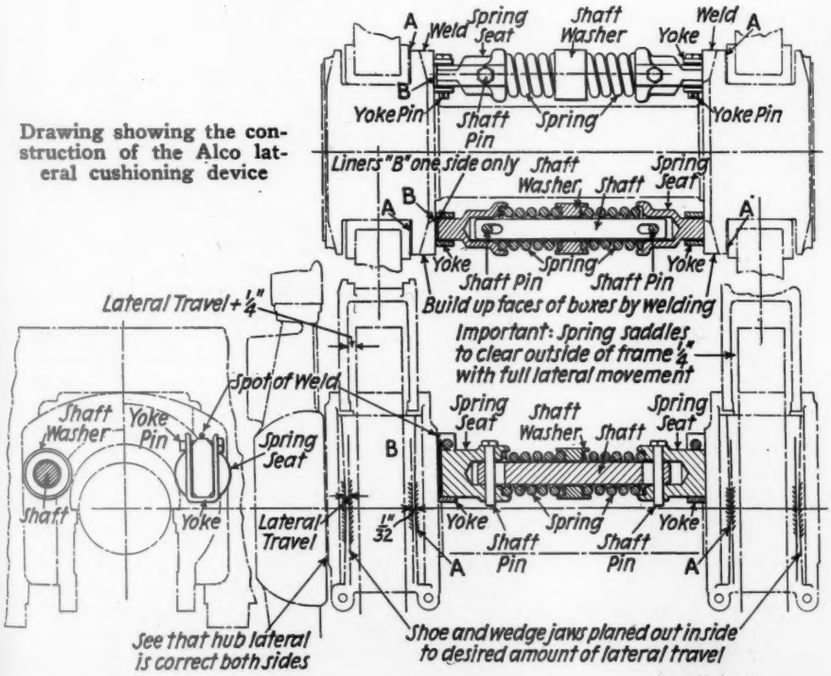
In applying the device the inside faces of the boxes are built-up by welding to form seats for the yokes. The shoe and wedge jaws are planed on the outside faces to the desired amount of lateral travel. The spring saddle should clear the outside of the frame by ¼ in. with the full amount of lateral movement.

Liners are used to correct the hub lateral on both sides where necessary. To make adjustments, liners *A* are inserted between the flanges of the box and the shoes and wedges. These liners should be of the same thickness as the working clearance, 1/32 in. The box is pushed against the liners *A* and the width of the space required for the liner *B* is measured on one side only, and with the cushioning unit pushed hard against the box on the opposite side. The thickness of the liner *B* should be made to just fill the space by tapping it lightly into position. It is secured to the box by a spot of welding. When the work of applying the liner *B* has been completed, the liners *A* are removed. The device as assembled by the manufacturers is set to the correct initial compression which may later be varied by applying a shaft washer of suitable thickness.

No outward pressure is exerted by the compression springs against the box while a locomotive is running on tangent track, the boxes having free working clearances in the shoe and wedge jaws. When entering a curve, the wheel flange against the outer rail moves inward and carries with it the inside box, compressing the springs against the outside box. The greater the lateral movement of the device, the higher the compression while the lateral shock is cushioned by the springs. On leaving the curve the springs return the boxes to their normal central position.



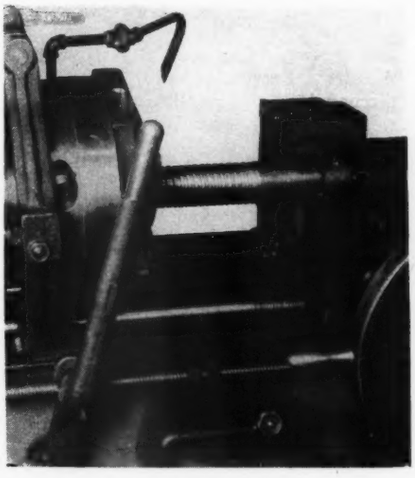
Alco lateral cushioning device as applied to a pair of driving wheels



Drawing showing the construction of the Alco lateral cushioning device

Landis 4-In. Rotary Die Head

A new die head having a capacity up to and including 4 in. diameter and equipped with a roughing and finishing attachment has been developed by the Landis Machine Company, Inc., Waynesboro, Pa., for use on the Landis 4 in. leadscrew threading machine.



Landis rotary die head cutting a coarse-pitch screw

This die head is recommended for cutting coarse pitch threads on valve stems, vise screws, jack screws and similar classes of work which require great accuracy and smooth finish.

The roughing and finishing cuts are controlled by a latch mounted on the yoke bracket. The release of the latch, after the roughing cut is made, permits the die head to close for a light finishing cut. The amount of metal removed during this cut is approximately .045 in.

No cutting strains are transmitted either to the die head yoke or the roughing and finishing attachment. The die head is locked within itself when set for either the roughing or finishing cut, thus making it possible to produce threads that are free from taper and uniformly accurate for size.

A pitch indicator is employed to assist the operator in timing the engagement of the leadscrew nut for the finishing cut.

This die head can be used for cutting single, double, triple and quadruple threads from ¾ in. to 4 in. in diameter with a maximum lead of ½ in.

Among the Clubs and Associations

P. & S. Division to Meet in Chicago.—Division VI—Purchases and Stores of the American Railway Association will hold its annual meeting at the Hotel Stevens, Chicago, June 22 and 23.

Southern and Southwestern Railway Club.—C. M. Darden, superintendent machinery, Nashville, Chattanooga & St. Louis, will present a paper on fuel economy before the meeting of the Southern and Southwestern Railway Club which will be held at 10 a.m. on May 19 at the Ansley Hotel, Atlanta, Ga.

Northwest Car Men's Association.—Accident Prevention will be the topic discussed at the meeting of the Northwest Car Men's Association which will be held at 8 p.m. on May 16 at the Gymnasium room of the Minnesota Transfer, Y.M.C.A., St. Paul, Minn. There will be motion pictures and a talk by J. Marshal of the American Railway Association.

Central Railway Club of Buffalo.—"Rail, Research and Detection" is the title of a paper to be presented by C. B. Bronson, assistant inspecting engineer, New York Central Lines, before the meeting of the Central Railway Club of Buffalo to be held at 8 p.m., daylight saving time, on May 12 at the Hotel Statler, Buffalo, N. Y. Motion pictures will show the detector car in operation, and entertainment will be provided by the New York Central Sextette.

Pacific Railway Club.—On Thursday evening May 12, at 7:30 p.m. at the Transportation Club, Palace Hotel, San Francisco, Cal., The Cause of Loss and Damage will be discussed from the viewpoint of yardmen, trainmen, enginemen and management. George Rowland, general yardmaster, Southern Pacific, will present the yardmen's viewpoint, and O. Homer Bryan, locomotive engineer, Western Pacific, will present the enginemen's viewpoint. The two other speakers have not yet been announced.

American Society for Testing Materials.—During the course of the thirty-fifth annual meeting of the American Society for Testing Materials, which will be held at the new Haddon Hall, Atlantic City, N. J., June 20-24, there will be several technical sessions of unusual interest. Two joint sessions, held in cooperation with the American Foundrymen's Association, will be devoted to a Symposium on Steel Castings. A.S.T.M. Committee D-13 on Textile Materials is sponsoring a session in its field of work, and various aspects of the subject "Acquisition of Good Data" will be discussed at two round-table conferences. Other groups of papers will involve metals, cement, concrete, brick, pigments, and testing and testing apparatus. Included among the many committee reports are one on gum content of gasoline and another on the investigation of structural steel embrittlement due to hot galvanizing.

Mechanical Association Conventions.—On March 28 representatives of the Air Brake Association, American Railway Tool Foremen's Association, Association of Railway Electrical Engineers, Car Department Officers Association, International Railroad Master Blacksmiths' Association, International Railway Fuel Association, International Railway General Foremen's Association, Master Boiler Makers' Association, Traveling Engineers' Association, and Equipment Painting Section, A.R.A., met at Chicago with the Sub-Committee of the General Committee, Mechanical Division, American Railway Association. As the result of this meeting it was definitely decided that no meetings of these associations would be held during 1932. It was further decided that when meetings of these associations are resumed, the following associations should hold their meetings at the same place and in the same week: International Railway Fuel Association, Traveling Engineers' Association, Car Department Officers Association, Air Brake Association, International Railway General Foremen's Association, American Railway Tool Foremen's Association, International Railway Master Blacksmiths' Association, Master Boiler Makers' Association and Equipment Painting Section, A.R.A. ¶ The question of whether this week would be a calendar week or would include Thursday, Friday and Saturday of one calendar week and Monday, Tuesday and Wednesday of the following calendar week was discussed, the general consensus of opinion being that the last three days of one week and the first three days in the following week would be preferable. ¶ The representatives of the various associations present agreed also to take under advisement the possibility of further co-ordination or consolidation to avoid any overlap in the work of their associations. The question of dates, place, grouping, etc., of such meetings, when conditions are such that conventions can be held, will be left in the hands of the General Committee of the Mechanical Division to be handled through the Sub-Committee of that Division. ¶ At the request of its officers, the Association of Railway Electrical Engineers was eliminated from the proposed plan. ¶ The annual meeting of the Mechanical Division, A.R.A., is scheduled for Thursday and Friday, June 23 and 24, Congress Hotel, Chicago.

The Railway Business Association.—This association is being reorganized and expanded so that it may function more effectively for the good of the railways. The plans provide for changes in its administration and for refinancing on a larger scale so that the association can undertake an extensive campaign to better the present unsatisfactory situation of the railways. As a step in this reorganization, the headquarters of the association will be moved from Philadelphia to Chicago. Present plans also contemplate a change in the name, the Railway Manufacturers' Association being suggested. ¶ Under the new arrangement the present members of the general executive committee will become a board of directors and a new executive committee will be created, consisting of the following: George E. Scott, president of the American Steel Foundries, Chicago, (chairman); George H. Houston, president of the Baldwin Locomotive Works, Philadelphia, Pa.; George P. Baldwin, vice-president of the General Electric Company, New York; H. S. Humphrey, executive director of the Westinghouse Air Brake Company, Wilmerding, Pa.; F. N. Bard, president of the Barco Manufacturing Company, Chicago; W. B. Given, Jr., president of the American Brake Shoe & Foundry Company, New York; C. A. Liddle, president of the Pullman Car & Manufacturing Corporation, Chicago; W. E. Sharp, president of the Grip Nut Company, Chicago; and W. H. Woodin, president of the American Car & Foundry Company, New York. ¶ Harry A. Wheeler, formerly vice-chairman of the First National Bank of Chicago, has been selected as president and will be elected to succeed Alba B. Johnson. Mr. Wheeler was born in Brooklyn, N. Y., on May 26, 1866. In 1894 he became district manager of the Credit Clearing House, Chicago, and in 1899 was elected vice-president, which position he held until 1901, when he was elected president. In 1910 he resigned to become vice-president of the Union Trust Company and in 1924 was elected president. When the Union Trust Company was merged with the First National Bank of Chicago in February, 1929, Mr. Wheeler became vice-chairman of the latter institution, which position he held until July, 1931. In 1912-13 and again in 1918-19, he was president of the Chamber of Commerce of the United States and in 1919 was a member of the White House Industrial Conference. In 1917-18 he served as Federal Food Administrator for Illinois.

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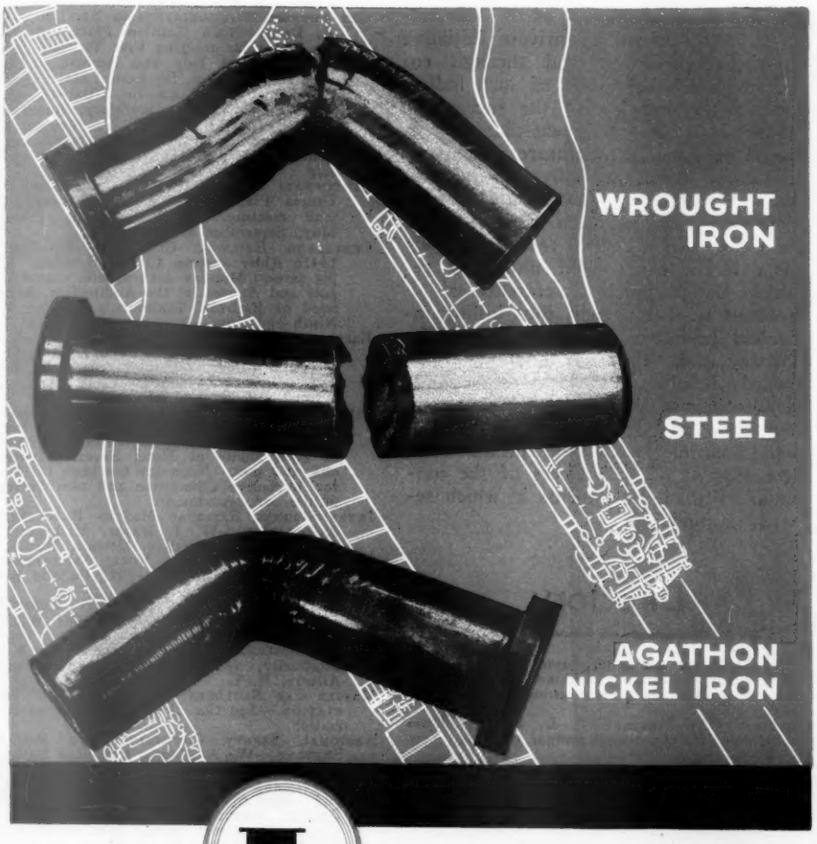

These pins all have the same surface hardness and case depth. They were tested on a V-block under a steam hammer. Note toughness of Agathon Nickel Iron.

LOWER THE COST OF CASE-HARDENED PARTS

AGATHON NICKEL IRON gives a tougher core at a saving in cost

The metallurgist has revolutionized the characteristics of the old familiar iron. « For case-hardened pins and bushings in railroad service, Republic Steel Corporation has developed Agathon Nickel Iron—the iron with a tougher core. « Uniform in composition all the way through and without slag spots or seams, this alloy iron gives a fine case and an unusually tough core. « Warping is almost negligible. Pins and bushings may be machined to size, polished, carburized and quenched from the pot without spoiling the surface or smoothness. The finished cost of case-hardened parts made of Agathon Nickel Iron is lower than ordinary iron. « Try this modern alloy iron for all case-hardened pins and bushings.

Toncan Iron Boiler Tubes, Pipe, Plates, Culverts, Rivets, Staybolts, Tender Plates and Firebox Sheets • Sheets and Strip for special railroad purposes • Agathon Alloy Steels for Locomotive Parts • Agathon Engine Bolt Steel • Nitralloy Agathon Iron for Pins and Bushings • Agathon Staybolt Iron • Climax Steel Staybolts • Upson Bolts and Nuts • Track Material, Maney Guard Rail Assemblies • Enduro Stainless Steel for dining car equipment, for refrigeration cars and for firebox sheets Agathon Nickel Forging Steel (20-27 Carbon)

CENTRAL ALLOY DIVISION

REPUBLIC STEEL CORPORATION

MASSILLON OHIO

Club Papers

C. A. Gill Describes Russian Situation at N. Y. Railroad Club

New York Railroad Club.—Meeting held April 15 at the Engineering Societies building, 29 West Thirty-Ninth street, New York. Subject, "The Russian Situation as Observed by an American Railroad Man," by C. A. Gill, former superintendent of motive power, Eastern Lines, Baltimore & Ohio. ¶Mr. Gill, who has recently completed a year's service as chief consulting mechanical engineer of the Russian Railways, with headquarters at Moscow, U. S. S. R., presented comprehensive figures on the industrial, commercial, educational and social development of Russia under the five-year plan, adding his own observations as to living conditions and results achieved by the program of industrialization. That program in itself, however, is only a means to an end, its chief purpose, as he observed it, being the improvement of the material and cultural condition of the workers. Mr. Gill also called attention to the fact that, although the Soviet government has already purchased in this country goods valued at more than $600,000,000, buying is now declining in favor of England, France and Germany, where the Russians are able to obtain better credit facilities. ¶Among the invited guests at the meeting, which was one of the largest on record, were Colonel Hugh L. Cooper, consulting engineer to the Soviet government on the design and construction of the 750,000-hp. Dnieprostroy hydroelectric and navigation project.

Railway Research

Western Railway Club.—Meeting held Monday evening, April 18, at the Hotel Sherman, Chicago. Subject, American Railway Association and Research, by M. J. Gormley, executive vice-president, American Railway Association. ¶Mr. Gormley devoted a considerable portion of his address to a review of the joint activities of the railways through the various divisions of the American Railway Association. He pointed out that all of the divisions of the association, except the Car Service Division, function through committees composed of railway men and pointed out that a recently compiled summary of the subjects considered in this way comprises a mimeographed booklet of 228 pages and contains three thousand items. ¶While the association has no research agency in the sense that the term implies in industry, Mr. Gormley called attention to the elaborate studies and tests which have been made by the American Railway Association in centralized research projects pertaining to specific problems, such, for instance, as power brakes, the development of the Sperry transverse fissure car through co-operation with the Engineering Division, and the tests now in progress in connection with the automatic train-line connectors and draft gears. ¶"It should be kept clearly in mind," said Mr. Gormley, "that all of the past accomplishments of the railroads have been attained by private initiative working individually and through coordination of the results of such individual effort. In view of the success of this method, it seems patent that nothing should be done in the future which will take away from the individual railroad officer the desire to work out his own problems. Fear has been expressed that the creation of a central research agency on a large scale would ultimately result in the perfunctory reference of all problems to that agency, thus killing individual initiative." ¶In conclusion Mr. Gormley said, "Progress should continue toward definite objectives, with some advance idea of the benefits to be derived therefrom, and in such a way that it would continue to have the full and complete support of the officers of the particular railroad departments in which research is undertaken."

Directory

The following list gives names of secretaries, dates of next or regular meetings and places of meeting of mechanical associations and railroad clubs:

AIR-BRAKE ASSOCIATION.—T. L. Burton, Room 5605 Grand Central Terminal building, New York.

ALLIED RAILWAY SUPPLY ASSOCIATION.—F. W. Venton, Crane Company, Chicago.

AMERICAN RAILWAY ASSOCIATION.—DIVISION V.—MECHANICAL.—V. R. Hawthorne, 59 East Van Buren street, Chicago. Meeting June 23-24, Congress Hotel, Chicago.

DIVISION V.—EQUIPMENT PAINTING SECTION.—V. R. Hawthorne, Chicago.

DIVISION VI.—PURCHASES AND STORES.—W. J. Farrell, 30 Vesey street, New York. Meeting June 22-23, Hotel Stevens, Chicago.

DIVISION I. — SAFETY SECTION. — J. C. Caviston, 30 Vesey street, New York.

DIVISION VIII.—CAR SERVICE DIVISION.—C. A. Buch, Seventeenth and H. streets, Washington, D. C.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—G. G. Macina, 11402 Calumet avenue, Chicago.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. Thirty-ninth street, New York.

RAILROAD DIVISION.—Marion B. Richardson, associate editor, *Railway Mechanical* Engineer, 30 Church Street.

MACHINE SHOP PRACTICE DIVISION. — Carlos de Zafra, care of A. S. M. E., 29 West Thirty-ninth street, New York.

MATERIALS HANDLING DIVISION.—M. W. Potts, Alvey-Ferguson Company, 1440 Broadway, New York.

OIL AND GAS POWER DIVISION.—L. H. Morrison, associate editor, Power, 475 Tenth avenue, New York.

FUELS DIVISION.—A. D. Black, associate editor, Power, 475 Tenth avenue, New York.

AMERICAN SOCIETY FOR STEEL TREATING.—W. H. Eiseman, 7016 Euclid avenue, Cleveland, Ohio.

AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, 1315 Spruce street, Philadelphia, Pa. Annual meeting June 20-24, Haddon Hall, Atlantic City, N. J.

AMERICAN WELDING SOCIETY.—Miss M. M. Kelly, 29 West Thirty-ninth street, New York.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Joseph A. Andrucetti, C. & N. W., Room 411, C. & N. W. Station, Chicago, Ill.

CANADIAN RAILWAY CLUB.—C. R. Crook, 2276 Wilson avenue, Montreal, Que. Regular meetings, second Monday of each month except in June, July and August at Windsor Hotel, Montreal, Que.

CAR DEPARTMENT OFFICERS ASSOCIATION.—A. S. Sternberg, master car builder, Belt Railway of Chicago.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—G. K. Oliver, Thirty-Eighth street and Sacramento avenue, Chicago. Regular meetings, second Monday in each month except June, July and August, Auditorium Hotel, Chicago, Ill.

CAR FOREMEN'S ASSOCIATION OF OMAHA, Council Bluffs and South Omaha Interchange.—Geo. Kriegler, car foreman, Chicago, Burlington & Quincy, Sixteenth avenue and Sixth streets, Council Bluffs, Iowa. Regular meetings, second Thursday of each month at Council Bluffs.

CAR FOREMEN'S ASSOCIATION OF ST. LOUIS.—Jos. F. Brady, 4036 Scanlon Place, St. Louis, Mo. Regular meeting first Tuesday in each month, except July and August, at American Hotel Annex, St. Louis, Mo.

CENTRAL RAILWAY CLUB OF BUFFALO.—T. J. O'Donnell, executive secretary, Room 1817, Hotel Statler, Buffalo, N. Y. Regular meeting, second Thursday each month, except June, July and August, at Hotel Statler, Buffalo.

CINCINNATI RAILWAY CLUB.—D. R. Boyd, 2920 Utopia Place, Hyde Park, Cincinnati, Regular meeting, second Tuesday, February, May, September and November.

CLEVELAND RAILWAY CLUB.—F. B. Frericks, 14416 Alder avenue, Cleveland, Ohio. Meeting second Monday each month, except June, July and August, at the Auditorium, Brotherhood of Railroad Trainmen's building, West Ninth and Superior avenue, Cleveland.

EASTERN CAR FOREMEN'S ASSOCIATION.—E. L. Brown, care of the Baltimore & Ohio, Staten Island, N. Y. Regular meetings fourth Friday of each month, except June, July, August and September.

INDIANAPOLIS CAR INSPECTION ASSOCIATION.—P. M. Pursian, 823 Big Four building, Indianapolis, Ind. Regular meetings first Monday of each month at Hotel Severin, Indianapolis, at 7 p.m. Noon-day luncheon 12:15 p.m. for Executive Committee and men interested in the car department.

INTERNATIONAL RAILROAD MASTER BLACKSMITH'S ASSOCIATION.—W. J. Mayer, Michigan Central, 2347 Clark avenue, Detroit, Mich.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. T. Winkless, Room 707, LaSalle Street Station, Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—William Hall, 1061 W. Wabash street, Winona, Minn.

MASTER BOILERMAKERS' ASSOCIATION. — A. F. Stiglmeier, secretary, 29 Parkwood street, Albany, N. Y.

MASTER CAR BUILDERS' AND SUPERVISORS' ASSOCIATION.—See Car Department Officers Association.

NATIONAL SAFETY COUNCIL—STEAM RAILROAD SECTION.—W. A. Booth, Canadian National, Montreal, Que.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic avenue, Boston, Mass. Regular meeting, second Tuesday in each month, excepting June, July, August and September. Copley-Plaza Hotel, Boston.

NEW YORK RAILROAD CLUB.—A. N. Dugan, National Bearing Metals Corporation, 230 Park avenue, New York. Meetings third Friday in each month, except June, July and August, at 29 West Thirty-ninth street, New York.

NORTHWEST CAR MEN'S ASSOCIATION.—E. N. Myers, chief interchange inspector, Minnesota Transfer Railway, St. Paul, Minn. Meeting third Monday each month, except June, July, and August, at Minnesota Transfer Y. M. C. A. Gymnasium building, St. Paul.

PACIFIC RAILWAY CLUB.—W. S. Wollner, P. O. Box 3275, San Francisco, Cal. Regular meetings, second Thursday of each month in San Francisco and Oakland, Cal., alternately.

RAILWAY BUSINESS ASSOCIATION. — Frank W. Noxon, 1124 Woodward building, Washington, D. C.

RAILWAY CAR MEN'S CLUB OF PEORIA AND PEKIN.—C. L. Roberts, R. F. D. 5, Peoria, Ill.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 1841 Oliver building, Pittsburgh, Pa. Regular meeting fourth Thursday in month, except June, July and August, Ft. Pitt Hotel, Pittsburgh, Pa.

RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett. Baltimore & Ohio, Baltimore, Md.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver building, Pittsburgh, Pa. Meets with Mechanical Division and Purchases and Stores Division, American Railway Association.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, M. P. O. Drawer 24, St. Louis, Mo. Regular meetings, second Friday in each month, except June, July and August.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. T. Miller, P. O. Box 1205, Atlanta, Ga. Regular meetings third Thursday in January, March, May, July, September and November. Annual meeting third Thursday in November, Ansley Hotel, Atlanta, Ga.

SUPPLY MEN'S ASSOCIATION. — E. H. Hancock, treasurer, Louisville Varnish Company, Louisville, Ky. Meets with Equipment Painting Section, Mechanical Division American Railway Association.

TORONTO RAILWAY CLUB.—J. A. Murphy, Box A, Terminal "A," Toronto, Ont. Meetings third Monday of each month, except June, July and August.

TRAVELING ENGINEERS' ASSOCIATION. — W. O. Thompson, 1177 East Ninety-eight street, Cleveland, Ohio.

WESTERN RAILWAY CLUB.—J. H. Nash, 343 South Dearborn street, Chicago. Regular meetings, third Monday in each month.

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NEWS

Baltimore & Ohio Increases Shop Hours

ABOUT 6,900 shop employees of the Baltimore & Ohio in the maintenance of equipment department who have been working on a four-day week basis for the past five months, were on April 1, placed on a five-day week.

N. Y. C. Reopens Additional Shop

THE ASHTABULA HARBOR (Ohio) car repair shops of the New York Central which are maintained to make light repairs, were reopened on April 4, when 49 men were recalled to work. This is in addition to the recall of some 7,000 employees of car and locomotive shops recently reopened at other points on the New York Central system, as reported in the April issue of the *Railway Mechanical Engineer*.

Tentative Standards

THE PROPOSED American Tentative Standard for Lock Washers has been released by Sub-Committee No. 2 of the Sectional Committee on the Standardization of Plain and Lock Washers, American Standards Association, and can be obtained by writing C. B. LePage, assistant secretary, American Society of Mechanical Engineers, 29 West Thirty-Ninth street, New York.

In addition to introductory notes, this standard includes a table of dimensions for lock washers (spring washers) giving the nominal size, actual inside diameter, dimensions for washers for use with wrench head bolts and nuts, and slotted head screws.

The American Standards Association has also set up a new sub-committee on nomenclature which will attempt to prepare a nationally accepted nomenclature for lathes and other tools.

Tentative specifications for normalized and tempered alloy-steel forgings for locomotives, issued by the American Society for Testing Materials, cover the manufacture, chemical properties and tests, physical properties and tests, workmanship and finish, marking, and inspection and rejections of two classes of normalized and tempered alloy-steel forgings— (1) Medium tensile strength with high yield point and high ductility, and (2) high tensile strength with considerable ductility. Criticisms of these specifications should be directed to V. H. Lawrence, secretary of Committee A-1 on Steel, Alan Wood Steel Company, Conshohocken, Pa.

By the unanimous action of Committee E-10 on Standards, a viscosity temperature chart has recently been adopted as a tentative standard. This chart was prepared by A.S.T.M. Committee D-2 on Petroleum Products and Lubricants and is expected to be of distinct service to petroleum, automotive and other industries. The new standard incorporates the best features of all charts previously used, particularly those of Larson and MacCoull. The chart, which is 16¼ in. by 21½ in., covers a temperature range from 30 deg. F. to 450 deg. F. and a viscosity range of 37 to 100,000,000 Saybolt universal seconds. It is available at the headquarters of the Society, 1315 Spruce street, Philadelphia, Pa., at 25 cents a single copy; $1.50 per pad of 25, or $5.00 for four pads.

Simplified Practice Recommendations

A PROPOSED modification of simplified practice recommendation No. 57 on wrought-iron and wrought-steel pipe, valves and fittings, by eliminating the 3½-in. nominal inside diameter pipe from Table 3—"Double Extra Strong Pipe," has been mailed by the Bureau of Standards, Washington, D. C., to all interested in the industry for their consideration and written approval. All other diameters and weights in the present draft of the recommendation are to be retained without change.

The revised simplified practice recommendation R105-32 covering wheelbarrows has received the required degree of acceptance from all interests in the industry and may be considered in effect as of April 1, 1932, according to an announcement by the Division of Simplified Practice, Bureau of Standards. Forty-one sizes and types of wheelbarrows were listed in the original simplified practice recommended. In the revised program this number was reduced to twenty-seven, and designation numbers have been given the wheelbarrows listed.

"Compartment Cars" for Freight on C. & N. W.

A NEW TYPE of service for l.c.l. freight is being offered by the Chicago & North Western, between Chicago and Waukegan, Ill., Kenosha, Wis., Racine and Milwaukee. Automobile box cars have been fitted with interior partitions to provide four freight compartments, two in each end, and the charges for the transportation of freight in these compartments will be based not on weight but on a flat rate of $15 per compartment. Furthermore, there are no packing requirements of any kind, the North Western assuming no responsibility for loss, damage or injury to the property transported due to insufficient packing or improper loading in the compartment. The compartment rate is based upon the shippers signing a release to $100 valuation for the freight in each compartment. When the release is not signed, the rate is to be $16.50 per compartment.

Ordinarily, the cars will be operated only from team-track to team-track, and the shipper and consignee will load and unload the freight at these team-tracks. There is provision, however, that if three or four compartments are loaded from one consigner to one consignee in one day on one bill of lading, the North Western will place the compartment car at any industry located on an industrial or private side track served by the road, for loading or unloading, without additional charge. The compartments will be locked or sealed by the shipper, the railway sealing only the outside doors of the cars.

The North Western has reconstructed 10 cars for this service, and more will be added if the service is proved to be valuable. Two partitions extend across the width of the cars, these being situated at the sides of the door openings. Additional partitions running lengthwise of the cars bisect the spaces enclosed by the crosswise partitions. Access to the compartments is had by means of doors, 7 ft. high and 4 ft. 1-11/16 in. wide, which form a part of the crosswise partitions. The compartments themselves are 17 ft. 8 in. long, 4 ft. 4-3/16 in. wide, and 10 ft. high.

B. & O. Air-Conditions National Limited Throughout

THE BALTIMORE & OHIO inaugurated the first completely air-conditioned through sleeping-car train on April 20, when the National Limited was made up entirely of fully air-conditioned cars on its regular runs in both directions between New York and St. Louis via Philadelphia, Baltimore, Washington, Cincinnati and Louisville. Plans for the inauguration of this improved service were kept a carefully guarded secret until two days before the event. Similar equipment will be assigned to the B. & O.'s Capitol Limited, operating between New York and Chicago, about the middle of next month.

Baltimore & Ohio executives, the announcement stated, regard air-conditioned sleeping cars as a major innovation in travel comfort. Their introduction follows two years of railroad air-conditioning development work in which the B. & O. pioneered in 1930 when the diner, Martha Washington, was placed in regular service between New York and Washington. Also, on this same run in May, 1931, the B. & O. established the Columbian, the first completely air-conditioned train.

The National Limited's equipment, together with that to be installed next month on the Capitol Limited, will bring the number of air-conditioned B. & O. cars to a total of 114. Those already equipped are considered sufficient for the trains necessary to maintain the regular daily schedules of the National Limited, both eastbound and westbound, as well as other B. & O. air-conditioned trains already in operation. The 114 air-con-

(Turn to next left-hand page)

ditioned cars will be of the following types: Three combination baggage and coach, seven individual seat coaches, two lounge cars, 10 parlor cars, nine Pullman club cars, seven Pullman observation cars, 46 Pullman sleepers and 30 diners.

Mechanical Division Acts to Increase Coupler Service Life

As a result of favorable action on an important letter ballot recently submitted to the individual members of the American Railway Association by the General Committee of the Mechanical Division, it is expected that large economies will be realized by extending the wear limits, without any sacrifice of safety, for Type-D and Type-E couplers and revising the regulations pertaining to the reclamation of coupler knuckles, locks, pins, bars and cast-steel yokes. In view of the potential far-reaching effects of this letter ballot in reducing coupler costs, as well as the frequency of holding cars out of service for coupler renewals, the practices described in the letter ballot being formally approved and put into effect as of May 1, 1932.

The vote on the recommendations from the Committee on Couplers and Draft Gears was divided into 19 propositions, the first three of which covered a proposed immediate extension of the gaging limit for Type-D and Type-E couplers to 5-5/16 in., as measured by the worn-coupler limit gage, illustrated in the committee report. Five propositions, receiving favorable action, pertained to reclamation of Type-D couplers, except those condemned for knuckle stretch or nose wear, by gas or electric welding, as recommended by the committee. Favorable action was taken on the proposition that coupler locks may be reclaimed by building up the depression in the surface of the lock, the welding not to extend beyond the surface surrounding the depression, as recommended by the committee. Favorable action was also taken on the proposition to reclaim knuckle pivot pins by heating, straightening and heat treating in accordance with practice specified by the committee.

The next seven propositions pertained to the reclamation of coupler bars, in accordance with detailed recommendations by the committee for the welding and normalizing of back walls; worn keyways; coupler-shank butts; guard-arm cracks (where not over 40 per cent of the section is affected and the crack does not extend into the lock opening or pocket); building up shanks worn from contact with the carrier iron; heating and straightening bars with bent shanks and bars with bent guard arms. The final proposition related to the reclamation of cast-steel coupler yokes, as recommended by the committee. All of these propositions involving changes in interchange rules will be included in a supplement to the rules to be issued August 1, 1932. In the meantime, the railroads were requested to issue necessary instructions to car inspectors, shop forces and reclamation plants to make the practices effective May 1.

Supply Trade Notes

The Sullivan Machinery Company has moved its Knoxville, Tenn., branch office from 623 Market street to Suite 803, Medical Arts building.

E. H. Batchelder, Jr., has been appointed railroad sales manager with headquarters at 608 South Dearborn street, Chicago, of The Insulite Company, Minneapolis, Minn.

William H. Woodin, president of the American Car & Foundry Company, New York, has been elected president also of the J. G. Brill Company, Philadelphia, Pa., to succeed Samuel M. Curwen, deceased.

George A. Nichols has been appointed New York district manager with headquarters in the Chrysler building, New York City, of The Kron Company, formerly The American Kron Scale Company, Bridgeport, Conn.

Sheldon, Morse, Hutchins & Easton, which was recently formed to handle industrial marketing and the economic problems connected with scientific industrial research, has moved its office from 191 West Fourth street to 420 Lexington avenue, New York City.

H. H. Timken, chairman of the board of the Timken Roller Bearing Company has been elected also president of the company succeeding M. T. Lothrop, resigned. F. J. Griffiths, president of the Timken Steel & Tube Company has been elected a director, succeeding Mr. Lothrop. The other directors were re-elected.

At the board of directors' meeting of the United States Steel Corporation, New York, on April 19, William A. Irvin was formally elected president of the corporation to succeed James A. Farrell, retired. This change was announced in the April *Railway Mechanical Engineer*. Mr. Irvin was elected also a director.

The Dearborn Chemical Company, Chicago, has expanded its operations through the manufacture and sale of a new product known as Plumite, a chemical solvent for use in clearing clogged plumbing fixtures and soil pipes. It will be marketed chiefly through the retail grocery field.

The Detroit Office of the American Locomotive Company, and the Railway Steel Spring Company, in the General Motors building, Detroit, Mich., will be closed. J. W. Harty, who has represented both these companies in Detroit, will be transferred to the Cleveland office, located in the Terminal Tower building, Cleveland, Ohio.

Robert H. Binkerd is now vice-president and director of sales of the Baldwin Locomotive Works, Eddystone, Pa., having been elected a vice-president in addition to his former duties of director of sales. A portrait of Mr. Binkerd and a sketch of his career were published in the December, 1931, *Railway Mechanical Engineer*.

The Gregg Company, Ltd., has moved its sales and export office, located for the past ten years at 67 Wall street, to larger quarters at 19 Rector street, New York. This company has car building plants at Hackensack, N. J., and Loth, Belgium.

A. W. Thompson, vice-president since 1928, and for the past five years Pacific coast manager in charge of sales for Fairbanks, Morse & Co., Chicago, has been appointed vice-president in charge of manufacturing. He succeeds W. C. Heath, resigned.

H. C. Darby has been appointed district sales manager for the Inland Steel Company, Chicago, with headquarters at the Kansas City, Mo., office. Mr. Darby has been a member of the sales force of that office since November, 1926; he succeeds the late Orville P. Blake. Mark Hill has been appointed salesman in the Kansas City office.

George H. Weiler, former managing director of the Steel Forging Manufacturers' Association, and previous to that service for many years with the American Locomotive Company, has become associated with the sales department of the Standard Steel Works Company, Burnham, Pa., a subsidiary of the Baldwin Locomotive Works.

John C. Witherspoon, a director of Berry Brothers, Detroit, Mich., has been elected president, W. R. Carnegie, president and general manager, having retired. Thurlow J. Campbell, assistant general manager has been elected vice-president and general manager. C. L. Forgey, advertising manager has been appointed also general sales manager succeeding Walter Bartz, who has been appointed production manager, all with headquarters at Detroit.

Changes have been made in the organization of the transportation and government department of the Johns-Manville Sales Corporation, the operation of which department is supervised by George A. Nicol, Jr., vice-president, with headquarters at New York. The change involves the establishment of three regions in the United States: Eastern, Western and Pacific. The eastern region embraces the eastern and central divisions; the western region comprises the western and southwestern divisions, and the Pacific region covers the present territory of the Pacific division. There is no change in the Canadian set-up. Each of the three regions is in charge of a general sales manager as follows: Eastern region, R. P. Townsend, New York; western region, J. H. Trent, Chicago; Pacific region, W. J. Hennessy, San Francisco, Cal. In the divisional activities, J. D. Johnson, with headquarters at Cleveland, Ohio, assists R. P. Townsend. C. S. Clingman will assist J. H. Trent as manager of the southwestern division, western region, and T. O'Leary as manager of the western division, Chicago, will assist Mr. Trent.

(Turn to next left-hand page)

Look Forward

VERY soon the railroads will be compelled to return to active service many locomotives built ten, twenty or more years ago, unless such locomotives are shortly replaced by Strictly Modern Units, designed and equipped to meet present-day conditions.

With its ability to save fuel, develop increased power, and reduce maintenance expense, the Strictly Modern Locomotive is the outstanding revenue earner. Railroads cannot afford to ignore the many advantages offered by this up-to-date motive power.

LOOK FORWARD—NOW is the time to provide for greater economy, higher operating efficiency and improved service to travelers and shippers.

It Takes Modern Locomotives to make money these days!

MATTHIAS W. BALDWIN
FOUNDER 1831

THE
BALDWIN
LOCOMOTIVE WORKS
PHILADELPHIA

THOMAS DREVER, secretary and treasurer of the American Steel Foundries, Chicago, has been elected vice-president and treasurer, and O. E. Mount, assistant secretary and assistant treasurer, has been promoted to secretary and assistant treasurer. Due to ill health, G. G. Floyd, mechanical assistant to the president, has been relieved of active duties but will remain with the company in a consulting capacity. Charles L. Heater, sales engineer, has been promoted to general sales engineer.

WILLIAM H. CROFT has been elected a vice-president of the National Lead Company. This is in addition to his duties as president of the Magnus Company, Incorporated, of which he has been president since March, 1929. Mr. Croft will have headquarters both at Chicago and at New York. He has been connected with the Magnus Company for many years

William H. Croft

having entered the employ of the Hewitt Manufacturing Company, a subsidiary of the Magnus Metal Company, in 1893. In 1904, Mr. Croft became assistant to the president of the Magnus Metal Company, and the following year was made sales manager. In 1907 the National Lead Company acquired the Magnus Metal Company and its subsidiaries and Mr. Croft was elected vice-president in charge of operations and sales of both the Hewitt and the Magnus companies. On the merger of these two companies into the Magnus Company, Incorporated in 1915, Mr. Croft was elected first vice-president and since March, 1929, has been president of the company.

JAMES S. WATSON, vice-president in charge of the Link-Belt Company's Dodge works, Indianapolis, Ind., has been appointed vice-president and general manager of both the Dodge and the Ewart works, the company's two Indianapolis chain factories, succeeding George P. Torrence, who recently became president. Frank S. O'Neil, manager of the Ewart works, has been appointed assistant general manager of both Indianapolis plants and C. Walter Spalding, who has been connected with the Ewart works for a number of years, has been appointed sales manager of Ewart plant products.

Changes in Westinghouse Air Brake Company and Union Switch & Signal Company

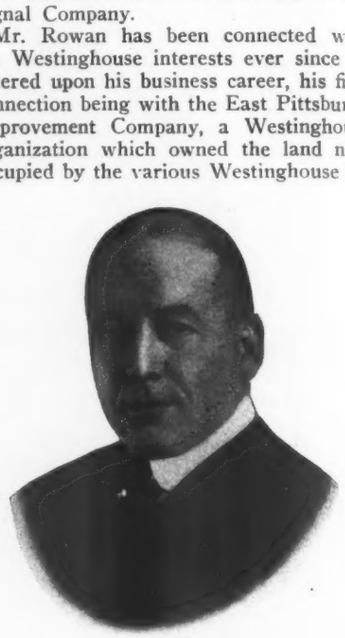
TO EFFECT CO-ORDINATION of the managerial staffs of the Westinghouse Air Brake Company and the Union Switch & Signal Company A. L. Humphrey, president of the Air Brake Company and chairman of the board of the Signal Company, has been elected executive director of both organizations. Charles A. Rowan, executive vice-president and a member of the board of the Air Brake Company, has been elected president of that company and vice-chairman of the board of the Signal Company. George A. Blackmore, president and general manager of the Signal Company, has been elected also a director and vice-president and general manager of the Air Brake Company. S. G. Down, vice-president of the Air Brake Company, has been elected also a director of the Signal Company. The two boards are now identical.

Mr. Humphrey was born in Buffalo, N. Y., on June 12, 1860, and at the age of 14 entered business. At the age of 22 he organized a general machine shop and foundry in Seattle, which afterwards be-

A. L. Humphrey

came the Moran Iron Works. Later he became division construction foreman on the Mojave division of the Central Pacific, and then master mechanic. Later he became superintendent of motive power of the Colorado Midland. While in Colorado he took an active part in politics and was twice elected to the Colorado House of Representatives, serving as speaker of the house during his second term. He returned to railroad service on the Colorado & Southern in 1899, and in 1903 became superintendent of motive power of the Chicago & Alton. Later in the same year he was appointed western manager of the Westinghouse Air Brake Company at Chicago, and in 1905 was promoted to general manager of the air brake works at Pittsburgh. He was elected a director of the company in 1909, at which time he was also given the dual position of vice-president and general manager. When the Union Switch & Signal Company was taken over by the Air Brake Company in 1916, Mr. Humphrey was elected also president of the Signal Company. In April, 1919, Mr. Humphrey was elected president of the Air Brake Company, and later also chairman of the board of the Signal Company.

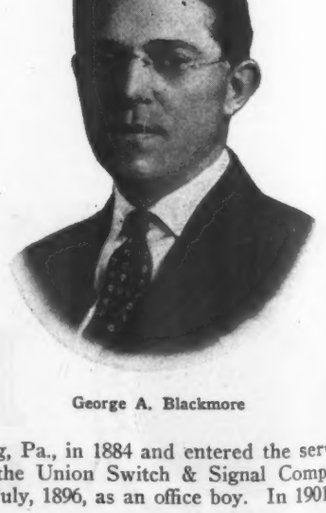
Mr. Rowan has been connected with the Westinghouse interests ever since he entered upon his business career, his first connection being with the East Pittsburgh Improvement Company, a Westinghouse organization which owned the land now occupied by the various Westinghouse in-



Charles A. Rowan

dustrial establishments in the Turtle Creek Valley. He began his connection with the Air Brake Company in 1903 as assistant auditor. From that position he has successively advanced to auditor in 1910, controller in 1916, vice-president and controller in 1919 and president of the Westinghouse International Brake & Signal Company in 1927, when he was transferred to Brussels, Belgium. He returned to this country in 1930 to become executive vice-president. He was elected a member of the board of directors of the Westinghouse Air Brake Company in 1929 and now becomes president of that company and vice-chairman of the board of the Union Switch & Signal Company.

Mr. Blackmore was born at Wilkins-



George A. Blackmore

burg, Pa., in 1884 and entered the service of the Union Switch & Signal Company in July, 1896, as an office boy. In 1901 he

was made chief clerk in the engineering and estimating department at Swissvale, Pa., and three years later was transferred to New York. In March, 1909, he was appointed assistant eastern manager with headquarters at New York, and in April, 1911, became eastern manager in charge of the New York, Montreal and Atlanta offices. In 1915 he was appointed general sales manager with headquarters at Swissvale, and in January, 1917, was elected vice-president. On June 13, 1922, Mr. Blackmore was elected first vice-president and general manager and in April, 1929, was elected president and general manager, which position he will hold with that of director and vice-president and general manager of the Air Brake Company.

Mr. Down was born on January 1, 1876, and entered railway service in the motive power department of the Michigan Cen-

S. G. Down

tral in 1893. In 1897 he resigned to engage in prospecting in Alaska, and three years later returned to the Michigan Central as general air-brake inspector. In 1902 he entered the employ of the Westinghouse Air Brake Company as an instructor, which position he held until 1906 when he was appointed mechanical expert. A year later he was made district engineer and in 1915 he was promoted to assistant western manager. From 1919 to 1921 he was Pacific district manager and then, until 1923, general sales manager. In the latter year he was elected vice-president, and now becomes also a director of the Signal Company.

Obituary

CORNELIUS M. WALSH, president and general manager of the Falls Hollow Staybolt Company, Cuyahoga Falls, Ohio, died at his home in that city on March 25 at the age of 68 years. Mr. Walsh was born at Cuyahoga Falls and spent his entire life there. He attended schools of his native town and began his business career as an employee of the lumber and planing mill establishment of Howe & Co. Mr. Walsh later bought the business and operated under the name of the Walsh Lumber Company, of which he was president. He also was president of the Walsh Paper Company and Walsh Milling Company.

EBEN M. BYERS, chairman of the board of the A. M. Byers Company, Pittsburgh, Pa., died on March 31 at the Doctors' Hospital, New York, at 52 years.

WILLIAM NEWTON AGNEW, traffic manager of the Worthington Pump & Machinery Corporation, New York, since 1910, and also assistant to the president for the past three years, died suddenly on April 12, at his home in New York.

SAMUEL M. CURWEN, president of the J. G. Brill Company since 1912, who died on March 29, was born on July 29, 1859, at Philadelphia, Pa., where he received his early education and was graduated from the Episcopal Academy in 1878. Mr. Curwen went to the Brill organization in 1879, and after an apprenticeship course in the Brill shops served in the engineering department, where he learned the practical fundamentals of car building and later was made head of the engineering department. Mr. Curwen subsequently served as a salesman and then held various executive positions, including those of assistant general manager and general manager, until he was elected second vice-president in 1903. He was advanced to first vice-president in 1908, and since May, 1912, was president of the company. Mr. Curwen, as a practical car

Samuel M. Curwen

and truck designer and builder, had contributed many valuable patents to the development of his company's product. In addition to serving as president of the J. G. Brill Company, he was president of its subsidiary companies of Missouri, of Massachusetts and of Ohio, and chairman of the board and a director of the Brill Corporation, New York, and a director of the American Car & Foundry Motors Company. He served as president, a director and chairman of the executive committee of the Electric Railway Equipment Securities Corporation, and was in addition a director of a large number of industrial and banking companies and of the American Railway Car Institute and the Reading Company. He was affiliated with a number of societies and organizations, including the American Electric Railway Association, the Engineer's Club of New York and the New York Railroad Club.

Personal Mention

Master Mechanics and Road Foremen

J. A. REDDEN, assistant road foreman of engines of the Baltimore division of the Pennsylvania, has been appointed assistant road foreman of engines of the Panhandle division.

A. C. BERDELMAN, road foreman of engines of the Indianapolis division of the Pennsylvania, has been appointed road foreman of engines of the Columbus division.

G. E. MELKER, master mechanic of the Chicago, Burlington & Quincy at Hannibal, Mo., has had his jurisdiction extended to include the St. Joseph division, succeeding G. S. Wilber, master mechanic at St. Joseph, Mo., and the position of master mechanic at the latter point has been abolished.

W. C. SMITH, master mechanic of the Illinois division of the Missouri Pacific at Dupo, Ill., has had his jurisdiction extended over the Missouri-Illinois in Missouri. The position of master mechanic at Poplar Bluff, Mo., with jurisdiction over the Missouri division and the Missouri-Illinois in Missouri, which has been held by E. F. Stroeh, has been abolished.

F. R. BUTTS, assistant master mechanic of the Chicago, Burlington & Quincy with headquarters at Creston, Iowa, has been transferred to St. Joseph, Mo., to occupy a newly-created position, and the position of assistant master mechanic at Creston has been abolished. The position of assistant master mechanic at Brookfield, Mo., which has been held by D. Nott, has also been discontinued, and Mr. Nott has been transferred to Galesburg, Ill., to succeed C. E. Plott, transferred.

JOHN J. PRENDERGAST, assistant master mechanic of the Fort Worth division of the Texas & Pacific, with headquarters at Lancaster shops, Fort Worth, Tex., has been promoted to the position of master mechanic. Mr. Prendergast's railroad career began as an apprentice on the Baltimore & Ohio. He then served as journeyman mechanic and foreman, resigning to enlist in the United States Army during the World War. At the conclusion of the war he entered the service of the Pennsylvania as a mechanical foreman, resigning to become mechanical inspector of the Texas & Pacific at Fort Worth in February, 1928, where he has since served successfully as enginehouse foreman, erecting shop foreman, general foreman and assistant master mechanic.

Shop and Enginehouse

D. MCINTYRE, machine foreman of the Missouri Pacific at Osawatomie, Kan., has been appointed general foreman, with headquarters at Wichita, Kan.

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HIONING DEVICE

Simple – Inexpensive – Effective
Improves Riding Qualities of Locomotives
Increases Life of Tires and Rails

THE Alco Lateral Cushioning Device was designed to soften the grinding pressure between tire flanges and rails when locomotives pass through curves and over rough track. Several applications have already demonstrated how effectively this simple device relieves lateral stresses in locomotives and track. The flanges on the drivers do not grind against the rails. The locomotives do not shimmy or show signs of vibration.

SIMPLE CONSTRUCTION—This device is a duplex lateral resilient means placed between the two driving boxes on each side of the axle in line with the journal bearing surfaces. Each unit consists of end spring seats keyed to a shaft by bolts and two A.R.A. Class G inner coil springs separated by a shaft washer. Two yokes, welded to the inside faces of the boxes, support the unit. Two of these units are required for each pair of drivers and can be applied to any or all pairs of drivers depending on the requirements. The device as assembled by Alco is set to the correct initial compression which may be varied later by applying a thicker or thinner shaft washer.

EFFECTIVE OPERATION—On tangent track there is no outward pressure exerted by the springs against the boxes which have free working clearance in the shoe and wedge jaws. When entering a curve however, the wheel flange against the outer rail moves inwardly, carrying with it the box on that side and compressing the springs against the opposite box. The greater the movement, the higher the compression while the lateral shock is cushioned by the springs. On leaving the curve the springs return the boxes to normal central position.

WORTHWHILE ADVANTAGES—This device is light in weight, easily applied and inexpensive. It increases the life of tires and rails, reduces locomotive maintenance and improves the riding qualities. It operates without disturbing the distribution of weight on the journals and can be used on all types of engines in all classes of service.

American Locomotive Company
30 Church Street New York N.Y.

B. P. PHELPS, engineer of shop extensions of the Atchison, Topeka & Santa Fe, with headquarters at Topeka, Kan., has taken over the duties of electrical engineer.

Purchases and Stores

A. S. MACDONALD has been appointed assistant general storekeeper, Eastern lines, of the Canadian Pacific, with headquarters at Montreal, Que.

J. JIROUSEK, storekeeper of the La Crosse division of the Chicago, Burlington & Quincy division, has been appointed assistant storekeeper, with headquarters as before at North La Crosse, Wis.

J. MAIER, storekeeper of the Aurora division of the Chicago, Burlington & Quincy, with headquarters at Aurora, Ill., has had his jurisdiction extended to include the La Crosse division.

LEON S. MYERS, acting division storekeeper of the Tacoma division of the Northern Pacific, with headquarters at Seattle, Wash., has been appointed storekeeper of that division, to succeed Glenn C. Hower, who has retired.

H. E. HAYS, road foreman of engines of the former Akron division of the Pennsylvania, has been appointed road foreman of engines of the E. and A. division.

O. NELSON, general storekeeper of the Union Pacific, at Omaha, Neb., has been appointed to the newly-created position of assistant general storekeeper of the system, with jurisdiction over the Union Pacific unit, and headquarters at Omaha.

J. L. IRISH, general storekeeper of the Oregon Short Line, the Oregon-Washington Railroad & Navigation Co., and the Los Angeles & Salt Lake (all units of the Union Pacific System), has been appointed to the newly-created position of assistant general storekeeper of the system, with jurisdiction over the above-mentioned units and with headquarters as before at Pocatello, Idaho. The positions of general supervisor of stores of the system, general storekeeper of the Union Pacific Railroad and general storekeeper of the O. S. L., the O.-W. R. R. & N. and the L. A. & S. L. have been abolished.

Obituary

WALTER SNYDER, master mechanic of the Erie at Stroudsburg, Pa., died on April 24. Mr. Snyder suffered a heart attack.

E. W. HOPP, master mechanic of the Hastings & Dakota division of the Chicago, Milwaukee, St. Paul & Pacific, at Aberdeen, S. D., died on March 30, as the result of injuries received in an automobile accident.

WILLIAM SCHLAFGE, formerly mechanical manager of the Erie, and also at one time president of the American Railway Master Mechanics' Association, died at Miami, Fla., on April 5. Mr. Schlafge, who was born on October 11, 1868, in Berlin, Germany, and was educated in the public schools of Mauch Chunk, Pa., obtained his first railway experience with the Lehigh Valley, beginning in 1882. In 1893 he became an apprentice at the Minneapolis, Minn., shops of the Minneapolis, St. Paul & Sault Ste. Marie, and subsequently served that road as enginehouse foreman at Gladstone, Mich. From 1898 to 1900 he was employed by the

William Schlafge

Escanaba & Lake Superior as locomotive fireman, locomotive engineman and master mechanic, leaving that road in the latter year to become enginehouse foreman for the Baltimore & Ohio, at Newark, Ohio. Subsequently, following a short period of service as general foreman in charge of the locomotive and car departments of the Chicago Junction (now operated by the Chicago River & Indiana), he became connected with the Erie, with which company he spent the remainder of his active railroad career. Starting with that road in March, 1903, as general foreman at Port Jervis, N. Y., Mr. Schlafge was promoted, in 1904, to master mechanic at Jersey City, N. J.; in December, 1906, to master car builder at Meadville, Pa.; in March, 1907, to general master mechanic and assistant mechanical superintendent; in October, 1907, to mechanical superintendent, lines east of Salamanca, N. Y., and Buffalo, and, on January 4, 1912, to general mechanical superintendent. This position Mr. Schlafge held until the termination of Federal control on March 1, 1920, when he was appointed mechanical manager of the Erie, with headquarters at New York. He resigned from this post in March, 1922, to become president of the Meadville Machinery Company, Inc., a corporation organized at that time to take over operation of a number of the Erie's car and locomotive shops. He retained that office until his subsequent retirement from active service. Mr. Schlafge was active for many years in the American Railway Master Mechanics' Association (now part of the Mechanical Division, American Railway Association), serving as president of the former organization from 1916 until his resignation in June, 1918. He was also for some time chairman of the Mechanical Division's Committee on Fuel Performance and Smoke Prevention.

Trade Publications

Copies of trade publications described in the column can be obtained by writing to the manufacturers. State the name and number of the bulletin or catalog desired, when mentioned in the description.

KELLOCATOR JIG BORING MACHINE.—The Keller Mechanical Engineering Corporation, 70 Washington street, Brooklyn, N. Y., describes in a 12-page booklet a precision boring and layout machine for small shops and departmental installations. A Vernier scale is the only measuring device on the Kellocator.

ELECTRIC TRUCKS.—Many freight handling operations are pictured and described in a 12-page booklet entitled "Handling Freight at Lower Cost Increases Railroad Profits" which has been issued by the Elwell-Parker Company, Cleveland, Ohio. The skid method of handling is described in a 16-page bulletin entitled "Handling and Shipping on Skids."

TOOLROOM LATHES.—Character and distinction feature the 24-page picture story of Monarch Model C lathes which has been prepared by the Monarch Machine Tool Company, Sidney, Ohio. The illustrations used in this catalog are of exceptional quality, the details of the lathes, their operation, etc., having been strikingly brought out by the use of spot lights. A cover, finished in gold, further adds to its attractiveness.

MODELS.—"Technical Models for Every Trade and Purpose" is the title of a 10-page booklet issued by the Paul F. Hermann Company, Keenan building, Pittsburgh, Pa. Models for transportation companies, for bridge construction companies, for railroads, for electric locomotive builders, etc., are illustrated in this booklet. The models are manufactured to any desired scale, either stationary or operating, for sales, exhibition or museum purposes. Cut sections can also be provided.

SPECIFICATIONS FOR STEELS.—The S.A.E. system of specifications for chemical composition and inspection standards for carbon and alloy steels are given in the bulletin, No. 1-a, of the International Nickel Company, 67 Wall Street, New York, which is a revision of bulletin No. 1 published several years ago. The specifications include additions and modifications made by the Society of Automotive Engineers since the original issuance of the bulletin.

WELDING AND CUTTING EQUIPMENT.—The new Blue and Gold pocket size catalog of the Torchweld Equipment Company, 224 North Carpenter street, Chicago, gives detailed information regarding the variety and characteristics of the non-flash Torchweld line. The different styles of welding or cutting torches, units and gas pressure regulators are described and illustrated and line drawings show the construction and safety features of the equipment.